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HENRI PIENINIEMI
DRIVING AN INDUSTRIAL ORGANIZATION TOWARDS A
BETTER UTILIZATION OF SALES ANALYTICS

Master of Science Thesis

Examiner: prof. Hannu Kärkkäinen
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ABSTRACT

HENRI PIENINIEMI: Driving an Industrial Organization Towards a Better Utilization of Sales Analytics

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Objective of the thesis work was to make an analysis for a large global cargo handling solution provider how they can improve their utilization of sales analytics. According to the topic, a main research question was drawn as “how to improve the utilization of sales analytics in industrial organization’s automation and project division by using maturity model”. To achieve the objective, a fully customized maturity model about sales analytics utilization was built. Through the interviews, current and target stages were found out. After having defined the current and target stages, a roadmap towards a higher maturity of sales analytics utilization is designed.

Today, organizations are seeking competitive advantage from data, but it is not simple as there are a lot of public data available. One way to gain advantage of data is analyzing it efficiently and managing it better than others. With the superior analyses made of raw and unstructured data, organization can gain a lot insight and valuable information. Sales data can be used to predict future sales as well as the demand for new solutions all around the world. Effective data analytics can provide a huge advantage while aiming towards a bigger slice of a market. When it comes to improving the utilization of sales analytics, it is crucial to understand what are current and target stages of the utilization and also how the target state can be achieved.

With maturity model, organization can define its current and target state of a selected topic, for example sales analytics utilization. Maturity models tend to have three basic components: dimensions having effect on a selected topic, levels of maturity and a definition what it means to be on a specific level. Maturity model can be supported by a roadmap, which shows the concrete steps towards the target state.

It was discovered that currently the target organization is in level 3 in Technology and Culture and level 2 in Governance and People. Target state for the dimensions were level 4 for Technology, Governance and People and level 5 for Culture. The reason for the three dimensions having target of level 4 was basically the resources it requires to achieve level 5. Roadmap was then built to advance from the current to target state. The research offered a very valuable information for the target organization about its utilization of sales analytics. Now the topic is put on the table and target organization has started talking about the meaning of sales analytics. Current and target state – and the roadmap – could be seen as direct benefits for the organization, but indirectly the most important achievement of the thesis work was to get the organization to speak about sales analytics and its benefit while gaining competitive advantage.

TIIVISTELMÄ

HENRI PIENINIEMI: Teollisuusyrityksen kehittäminen kohti parempaa myynnin analytiikan hyödyntämistä

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Työn tavoitteena oli tehdä analyysi globaalille teollisuusyritykselle heidän keinoistaan parantaa myynnin analytiikan hyödyntämistä. Päättökysymykseksi muotoutui ”miten parantaa myynnin analytiikan hyödyntämistä teollisuusyrityksen automaatio- ja projektidivisioonassa hyödyntäen maturiteettimallia”. Tavoitteen saavuttamiseksi luotiin kustomoitu myynnin analytiikan nyky- ja tavoitetilan arviointiin soveltuva maturiteettimalli. Kohdeorganisaatiossa tehtyjen haastattelujen myötä nyky- ja tavoitetila saatiin selville. Näiden selvittämisen jälkeen yritykselle rakennettiin 12 kuukauden mittainen toimintasuunnitelma, tiekartta, jota seuraamalla yritys pääsee kohti tavoitetilaa.

Nykyään monet organisaatiot tavoittelevat kilpailuetua datan avulla, mutta se on haastavaa suuren julkisen datan määrän vuoksi. Yksi kilpailuetua tuovista keinoista on muita parempi datan analysointi ja sen hallinta: datasta tehdyillä laadukkailla analyyseilla yritys voi saada arvokasta informaatiota ja tietämystä haluamastaan aiheesta. Myyntidataa voidaan käyttää ennustamaan tulevaisuuden myyntiä sekä tarvetta uusille ratkaisuille ympäri maailman. Tähdätessä kohti parempaa myynnin data analytiikan hyödyntämistä on tärkeää ymmärtää mikä on organisaation nyky- ja tavoitetila sen osalta, sekä myös keinot miten tavoitetila voidaan saavuttaa.

Maturiteettimallien avulla yritys voi määrittää nyky- ja tavoitetilan haluamastaan aiheesta, esimerkiksi myynnin analytiikan hyödyntämisestä. Pääsääntöisesti maturiteettimallit koostuvat kolmesta osa-alueesta: dimensioista, maturiteetin tasosta ja määritelmästä mitä yksittäisellä tasolla oleminen tarkoittaa. Maturiteettimalli tukena voidaan käyttää toimintasuunnitelmaa esittäessä konkreettisia toimenpiteitä kohti tavoitetilan saavuttamista.

Tutkimuksessa saatiin selville että kohdeorganisaatio on maturiteetiltaan tasolla 3 teknologiassa ja kulttuurissa sekä tasolla 2 datahallinnassa ja ihmisissä. Tavoitetila asetettiin haastattelujen ja analyysien myötä tasolle 4 teknologiassa, datahallinnassa ja ihmisissä. Kulttuurin osalta kohdeorganisaatio haluaisi saavuttaa tason viisi, mikä on mallin korkein taso. Pääsyy kolmen dimension tavoitetason asettamiseksi tasolle 4 tason 5 sijaan oli resurssien määrä joka tarvittaisiin tavoitellessa korkeinta maturiteettia. Lopuksi rakennettiin toimintasuunnitelma. Tutkimus tarjosi kohdeorganisaatiolle hyödyllistä tietoa sen myynnin analytiikan hyödyntämisestä. Nyky- ja tavoitetilan sekä toimintasuunnitelma rakentaminen voidaan nähdä suorina hyötyinä organisaatiolle, mutta epäsuorasti diplomitöiden suurin saavutus oli myynnin analytiikan nostaminen pöydälle. Nyt organisaatiossa on käsitteistö, jolla puhua myynnin analytiikasta.

PREFACE

Many things, positive and negative, have happened during the time I have been conducting this thesis work. It has been a rollercoaster of feelings and emotions, but all the time the objective has been clear in the horizon: to graduate for Master of Science in autumn 2018. Now it is just a few clicks away.

I want to thank Prof. Hannu Kärkkäinen for suggesting me maturity models: without him I might still be wondering how to approach the challenge set by the target organization. I also want to thank the target organization for providing me suitable resources for the thesis work. Every employee that took part to the thesis project, including the interviewees, deserve thanks for their time and commitment. Especially Eeva Heikkonen and Marcus Nikander have had a huge impact on the research and its outcome.

Special thanks to my girlfriend for supporting me in the thesis work project and during challenging times in personal life. There have been so much going on that without you I don't know how I would have managed.

I would also want to thank all my friends and family who have supported me throughout the academic years. The greatest thanks go to my father who always made it possible for me to succeed and supported me in everything. You are not here to see this paper being completed, but you will always be in my heart.

Tampere, 14th of September 2018

Henri Pieniniemi

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LIST OF SYMBOLS AND ABBREVIATIONS

<i>BA</i>	= <i>Business Analytics</i>
<i>BACMM</i>	= <i>Business Analytics Capability Maturity Model</i>
<i>BI</i>	= <i>Business Intelligence</i>
<i>IT</i>	= <i>Information Technology</i>
<i>RBV</i>	= <i>Resource Based View</i>

1. INTRODUCTION

1.1 Research background

Today, many organizations realize that analytics and advanced analytics can provide an important competitive advantage (Halper & Stodder 2014). However, while talking about analytics, companies often do not have a common understanding what analytics actually mean. This has led to a problem where organizations have a little or none possibilities to discuss about the meaning and importance of analytics.

Analytics maturity model can bring up a shared, commonly understood, framework for organization that makes discussing possible. When everyone understands what analytics mean, organization can move on to the next step. With maturity model, companies can understand where they are and where they would like to go in their analytics deployment (Halper & Stodder 2014).

It is trending, that organizations want to evolve their analytics strategies beyond spreadsheets or simple dashboards; many seek to build a broad “analytics culture” in which data analysis plays an essential role in all decisions and is fundamental to business collaboration (Halper & Stodder 2014). Advanced analytics technologies have also began to gain ground, especially mapping, text and real time analytics. Companies have noticed that changing data to information using analytics provides competitive advantage in relatively easy way.

But, a question arises: if analytics can bring up advantage in highly competitive markets, why is there still organizations that are not utilizing it? Because many companies are lacking in basic tasks, systems and culture that makes analytics possible. To tackle the challenge of utilizing analytics, Cosic et al. (2012) have created a business analytics capability maturity model (BACMM). BA maturity models usually focus too much on the data warehousing aspect, but BACMM differs from other models by taking into account the impact of organizational context (Cosic et al. 2012).

Many organizations are interested in analytics, but don't have a plan where to start. Some firms are already taking steps towards a successful analytics, but wanting to understand what to do next. In addition, there are few companies that are already enjoying the advantage gotten from analytics, but still wondering what they should be doing to maintain their position on the top. (Halper & Stodder 2014)

A target organization for this thesis work is starting its analytics journey and wants to understand what the current state in utilizing analytics is and what should be done next while moving towards a better utilization of sales analytics.

1.2 Research objectives and research questions

The main objective is to improve the utilization of sales analytics in target organization's automation and project division (APD). However, the main objective can be divided in minor objectives. Minor objectives are smaller goals that cuts the main objective into easier and more touchable form. Minor objectives are:

- to clarify the actors that have an effect on sales analytics
- to do a research of organization's current state of sales analytics maturity
- to conduct an interview-survey in order to understand the desired level of sales analytics maturity
- to build a road map for the next rolling 12 months that guides towards better utilization of sales analytics.

To reach the objective, a customized maturity model for target organization is created. Next, the current and desired state of sales analytics is conducted through interviews in the company. Last, a roadmap for the next 12 months is built from current state to desired level in utilizing sales analytics.

Based on the research objective, main research question is drawn:

- how to improve the utilization of sales analytics in industrial organization's automation and project division by using maturity model?

Being able to answer to the main question, it is divided to the six secondary questions, which are:

- what is business intelligence and analytics for sales
- what are the dimensions that have an effect on sales analytics and what are the most critical ones
- how maturity model can be used to determine the current state of a company
- what is the current state of the organization in utilizing sales analytics
- what is the desired level, a goal, in utilizing sales analytics
- how to get to the desired level in utilizing sales analytics?

The goal is to create an analytics maturity model for target organization which can be then used to improve the utilization of sales analytics. With the maturity model, company will get valuable information about what are the dimensions that have an effect on sales analytics and what is organization's current state in utilizing analytics.

In addition, with the help of customized maturity model, company can set a desired state for its analytics maturity. After finding out the current state and setting a desired state, final outcome, a roadmap, towards the desired state is built and then presented to target organization.

1.3 Research scope and limitations

In this thesis work, scope is set to relatively broad as things related to sales analytics are quite complex. Despite concentrating to increase maturity in one particular dimension, research tries to understand the big picture and improve maturity in every dimension.

Scope in analytics is limited to sales analytics. Target organization is interested in improving sales analytics maturity, because it brings sales-related data closer to managerial decision making and makes it possible to do data-based decisions easier than before. In addition, scope is also limited to a target organization's business line Automation and Project Division (APD).

Data limitation is set to data that has a relation to target organization's sales. Data can be internal or external, real-time or historical, sales or order-related data. But common denominator for the data in research scope is that data has to have something to do with company's sales. Unnecessary restrictions for the structure of data is excluded as sales-related data can be rather complex and unstructured, especially when retrieved from external resources.

When it comes to maturity models, research does not compare them, but focuses on finding the most suitable model for target organization. After finding the model, it will then be customized it in order to achieve the best possible result. The base maturity model for the thesis work is presented in chapter 3.3, customization process in chapter 4.2 and the final customized maturity model in chapter 4.3.

In technology dimension, the comparison of different technologies are not included in the scope. Technology, in fact, can change once in a while, but the basic needs behind it stays stable year after year. In people dimension, the stress is on today's employee's capabilities and skills, excluding the recruitment and layoff-plans. In culture dimension, the concentration is in internal culture and its applicability to utilize sales analytics, limiting off the culture towards stakeholders and organizational culture in external communications. Speaking of governance, scope is in managing technological resources, i.e. information systems and data inside the systems, as well as managing the integration of technological systems.

As one of the objectives is building a 12 month road map, but its implementation is left out of the research scope. Moreover, the plan is to implement the road map in the near future, and that is why a concrete starting point is crucial to define in this research. Roadmap and its implementation schedule is presented in part 6.3.

1.4 Research methodology and structure

As main objective being better utilization of sales analytics in target organization, the research is based on a customized maturity model, which is not repeatable as positive research is. Results of the research are qualitative, with small samples and in-depth investigations. Putting it another way, results are not quantitative, for example highly structured data with large samples (Saunders et al. 2009). Therefore, research philosophy using Saunders' et al. (2009) terms is interpretivism, which is closer to pragmatism than positivism.

Saunders et al. (2009) presents that there are seven strategies that can be carried out in the research. Each strategy, in fact, can be used can be used for exploratory, descriptive and explanatory research. The main research strategies are experiment, survey, case study, action research, grounded theory, ethnography and archival research.

In this thesis, action research is conducted. Action research is, according to Coghlan and Brannik (2014), research in action rather than research about action. Schein emphasizes that action research is driven by sponsor's needs (Schein 1999), which, in this research is target organizations needs to utilize sales analytics better. "The strengths of an action research strategy are a focus on change, the recognition that time needs to be devoted to diagnosing, planning, taking action and evaluating, and the involvement of employees (practitioners) throughout the process" (Saunders et al. 2009). Referring to these facts, action research is reasonable research strategy for this research.

Technique and procedure used to gather data is semi-structured interviews inside the target organization. Information needed for bettering the utilization of sales analytics is qualitative, and qualitative information can be gathered by using interviews.

The terms quantitative and qualitative are used widely in business and management research to differentiate both data collection techniques and data analysis procedures. Quantitative is predominantly used as a synonym for any data analysis procedure (such as graphs or statistics) that generates or uses numerical data. In contrast, qualitative is used predominantly as a synonym for any data analysis procedure (such as categorizing data) that generates or use non-numerical data. (Saunders et al. 2009)

Interviews, in turn, are often classified on the basis of their level of structure. At one end of the spectrum are structured interviews in which quite a few, relatively structured, questions are asked.

On the other end are unstructured interviews, in which the emphasis is more on encouraging the respondent to talk around a theme. Semi-structured interview, the type used in this research, has attributes from both ends being partly structured, but still including some open ended and additionally asked sub-questions. (Rowley 2012)

1.5 Interview method and procedure

Interviews were conducted inside target organization for being able to clarify the current and desired maturity state in sales analytics. Also thoughts about how to move to the desired state were asked. Interviews were one hour of length and 12 interviews were conducted.

Answers and thoughts were collected with the help of available technologies, including voice recorder and google docs online document editor. Google docs appeared to be very useful tool, as respondents were also available to write down their thoughts in collaboration with the interviewer.

Interview were structured in five different parts. First, interviewer presented carefully the topic and maturity model, since especially the maturity model was not familiar to the respondents. Next, every dimension was asked in its own part in order to get respondent's focus on the particular dimension.

Every part included a question about current state, desired state and the concrete short-time actions that respondent would see useful while moving to the next level. In addition, and being characteristic for semi-structured interview, a few sub-questions were presented every now and then. 10-15 minutes were used in gathering the information of every dimension.

Even though the respondents presented their answers well, still very good knowledge of the industry and target organization were required. Answers were mostly qualitative without a clear structure, which emphasizes the interviewer's competence while interpreting the results.

Also, the used maturity model was new for respondents which set up a quite challenging ground. To avoid pitfalls, maturity model were explained thoroughly and respondent had a possibility to view the model beforehand and ask additional questions about the model. Model was received well and respondents saw it useful and suitable when it comes to measuring utilization level of sales analytics.

After the interview, Google docs document were open for respondent approximately for a week for allowing additional comments or other changes. It was discovered that all the respondents were surprisingly active in adding comments to the document afterwards. This, in turn, can be noted as very positive attitude towards the research – and possibly towards the topic itself.

2. BUSINESS INTELLIGENCE AND ANALYTICS FOR SALES

2.1 Setting up the ground

Today, data and information are often seen as the second most valuable resource of an organization (Ranjan 2009). Most valuable being the ones getting the job done: people. With utilizing data, people can do logical and argued decisions while driving an organization to better performance overall. Supporting decision making with available data and information is referred widely as business intelligence (BI) (Hautala 2017).

The term intelligence stems from the Latin word *intellectus*, which in turn means to comprehend or to perceive. Nowadays, tasks in business are different than tasks during the time when Latin was one of the dominant languages, but the concept of intelligence has stayed mainly untouched during the decades. It still has the meaning of understanding or knowing something that is closely related to the task at hand.

However, (business) intelligence has become a popular term in the business and information technology (IT) communities only in the 1990s (Chen et al. 2012). Even though it has been a widely used term, there are several definitions for it (Järvi 2007), which all are somehow related to storing, analyzing and using data for decision-making. Therefore, it can be argued that there are no commonly recognized meaning for BI.

Although, Negash's (2004) definition of BI has gain ground among the researchers. In 2004, Negash defined that "BI is used to understand the capabilities available in the firm; the state of the art, trends, and future directions in the markets, the technologies, and the regulatory environment in which the firm competes; and the actions of competitors and the implications of these actions". This can be accounted nowadays as a key definition for BI, which opened the scene and people started having somewhat common understanding of BI.

There are a large amount of definitions closely related to BI, such as competitive intelligence (popular term in North-America), competitor intelligence, market intelligence, customer intelligence and so on. According to Pirttimäki (2007), most of the terms focuses on external information whereas BI takes also into account an internal information.

But what is analytics then? It can be seen as the "extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions" (Davenport & Harris 2007). Halper and Stodder (2014) argue that analytics requires the ability to manage, collect, analyze and act on increasing

amounts of consistent and disparate data, at the right speed and on the right time. Davenport & Harris (2007), in turn, see that “business analytics refers to the collection, storage, analysis and interpretation of data in order to make better decisions and improve organizational performance”.

Analytics could be performed, in principle, by using common handwriting tools (e.g. paper, pencil and a ruler), but any somewhat clever person using analytics today would use IT-possibilities, especially BI-tools (Davenport & Harris 2007).

According to Chaudhuri et al. (2011), it is difficult to find a successful company that has not deployed BI technology for its sales and businesses. BI technology is used in many industries and there are plenty of examples available. Chaudhuri et al. (2011) mentions the following: “manufacturing for order shipment and customer support, transportation for fleet management, telecommunications for identifying reasons for customer churn, utilities for power usage analysis, and health care for outcomes analysis”.

While people think about analytics, they generally consider a range of relatively advanced techniques, such as BI-visualization tools, predictive modeling and sentiment analysis (Halper & Stodder 2014). However, in the real world, the range of using analytical software is huge, starting from spreadsheets (e.g. Excel) and ending to statistical near real-time BI-visualization tools (Davenport & Harris 2007). More often organizations utilize spreadsheets very effectively, but are having difficulties in gaining all the possible benefits from their BI-tools.

Chaudhuri et al. have (2011) identified that the data which BI tasks are performed often comes from different sources, and also, typically from multiple databases across the organization and external reports. Different sources contain data with varied quality such as codes, formats and inconsistent representations, which should be cleaned up before using the data. Therefore the challenges, e.g. cleaning, integrating and standardizing data, while preparing data for BI tasks can be rather problematic and time consuming. BI tasks usually need to be done cumulatively as the new data arrives”, for example last quarter’s sales figures. Chaudhuri (2011) adds, that “this makes efficient and scalable data loading and refresh capabilities imperative and crucial for BI”. (Chaudhuri et al. 2011)

2.2 Motivation to BI and analytics

Nowadays, when companies in many industries offer similar products and use comparable technology, high-performance business processes are among the last remaining points of differentiation (Davenport & Harris 2007). The same trend is seen in the cargo handling solutions industry, in which the target organization belongs. Geographical location does not appear to be a competitive advantage anymore, as well as proprietary technologies that are rapidly copied by competitors (Davenport & Harris 2007).

Therefore, a basic competition is carried out today by maximizing business efficiency and effectiveness, and to make the smartest possible business decisions. Analytical competitors' grasps every drop of value from business processes and key decisions, so there is no point of giving a huge advantage to them (Davenport & Harris 2007). In order to make better decisions and take the right actions, companies have to use analytics (Davenport et al. 2010). Research made by McAfee et al. (2012), presented in Harvard Business Review, indicates companies that utilize analytics are 5 percent more productive and 6 percent more profitable than other companies.

In another survey made by the state of business analytics in Bloomberg Businessweek (2011), 97 percent of companies with revenues exceeding \$100 million were found to use some kind of business analytics. In addition, an IBM study on 2010 showed that "CFOs in organizations that make extensive use of analytics report growth in revenues of 36 percent or more, a 15 percent greater return on invested capital and twice the rate of growth in EBITDA" (earnings before interest, taxes, depreciation and amortization) (IBM 2010). These surveys, among many other, show that there really are concrete benefits to be achieved by utilizing analytics.

But how to utilize analytics on a daily business? Davenport et al. (2010) argue that putting analytics to work is about "improving performance in key business domains using data and analysis". They state, that, managers tend to rely on their intuition or their "guts" while make business-decisions. At the same, important decisions have been based not on data, but on the experience and unaided judgment of the decision maker. Davenport's et al. research suggests that 40 percent of major decisions are based on the manager's gut instead of facts and data (Davenport et al. 2010).

Having said, sometimes intuitive and experience-based decisions work out pretty well, but often they left a room for an improvement: executives pursue mergers and acquisitions to palliate their egos, neglecting the sober considerations that create real value (Davenport et al. 2010). The same can be noted in container movement industry. Decisions of taking the project or not is mostly based on managers' guts of whether a company have enough resources to accomplish the project. There usually is enough data and information for rational decision, but the data and information does not find the path to decision-maker on the right place at the right time.

However, non-analytical decisions sometimes do not lead to tragedy, but do leave money on the table: pricing of the products and services are based on manager's guts about what the market will bear, not on actual data detailing what consumers have been willing to pay under similar circumstances in the past. In addition, managers may hire people based on intuition, not on an analysis of the skills and personality that predict an employee's high performance. (Davenport et al. 2010)

BI analytics (BI&A) is a key factor in gaining business advantage on highly competitive markets. Through BI&A, data can be converted into useful information and, through human analysis, into knowledge. Negash (2004) states, that some of the tasks related to analytics are performed by BI. As an example, he mentions that “creating forecasts based on historical data, past and current performance, and estimates of the direction in which the future will go, ‘what if’ analysis of the impacts of changes and alternative scenarios, ad-hoc access to the data to answer specific, non-routine questions, and strategic insight”.

BI&A, is often referred to as the techniques, technologies, systems, practices, methodologies, and applications that analyze critical business data to help an enterprise better understand its business and market and make timely business decisions (Chen et al. 2012). The possibilities related to data and positive analysis in different organizations that utilize analytics have raised a significant interest in data analytics. According to Chen et al. (2012), “BI&A includes business-centric practices and methodologies that can be applied to various applications such as e-commerce, market intelligence, e-government, healthcare, and security”.

Speaking of real-time BI, the competitive pressure of today’s businesses has led to the increased need for it. Chaudhuri et al. (2011) have presented that “the goal of near real-time BI (also referred as operational BI or just-in-time BI) is to reduce the latency between when operational data is acquired and when analysis over that data is possible”. This can be regarded as an important factor in business since having the newest data in decision-making enables better decisions and therefore a better performance of the company. Near real-time BI may even increase customer loyalty and revenue (Chaudhuri et al. 2011).

When it comes to analytic companies, according to Kiron & Shockley (2011), they tend to have a “data-oriented culture as well as competency in two areas: information management and analytic expertise. Both of these competencies require capabilities and resources beyond what is typically invested in baseline analytics.” In total, an information management, data-oriented culture and analytic expertise is what can be called competitive analytics – analytics that bring up advantage in the markets and enables better sales performance.

2.3 The benefits gained using analytics

When it comes to the benefits for utilizing analytics, there are several research that indicates better overall performance, including sales figures, for the organizations that use analytics extensively. One of the main factor that is mentioned in many researches is culture: in other words, employee’s attitude and willingness for using data in the decision-making.

Kiron & Shockley (2011) state that management support for analytics, including sponsors and top-down mandates, is critical. According to their research, “data-oriented culture at the enterprise level has three key characteristics: analytics is used as a strategic asset, management supports analytics throughout the organization and insights are widely available to those who need them”.

In addition, Shanks & Sharma (2011) presents that literature about gaining business value from IT investments has argued that business analytics systems, do not directly lead to business benefits. In turn, benefits are gotten in connection with other human and organizational capabilities: people and culture to mention.

According to Hostman (2010) “data mining and predictive analytics provide another means for further extending the value of BI-infrastructure and investments and, with the right set of competencies, gain more insight into business patterns within the information in return”. To say, Hostman also highlights the meaning of cultural and people assets as gaining the meaningful insights out of data is not achieved just by an excellent BI-tools.

Anderson-Lehman et al. (2004) present in their article how a large international tire-company gained insights and business competence from their data. Organization used data analytics and BI for example for customer segmentation, retention management and customer acquisition and resulted a huge additional sales revenues due to the improved customer loyalty and new customer acquisitions. Forecasting and predicting demand were one of the most valuable insights. Company gained a lot information about the areas where they lack in but where markets are high, and then were able to (re-)allocate assets to those areas.

Speaking of most advanced companies utilizing analytics, they typically have a strong data-oriented culture that supports and guides usage of analytics (Kiron & Shockley 2011). According to their research, “having the right combination of tools, data and people is usually not enough. Without strong cultural commitments, the success of an analytics program can be easily shortchanged or derailed”. However, this kind of culture does not come easily. People have their own ways of doing their tasks (e.g. important business-decisions) and changing it is usually hard.

Sometimes BI and analytics is more of showing what is possible with the data than creating to the users exactly what they want. Users might not even know what can be seen and achieved by the data. Anderson-Lehman et al. (2004) present how a company’s data warehousing employees developed prototype-visualizations to show what is possible by using data and BI-tools.

As the users saw how data were mapped and shown in a visual format, they started understanding the possibilities of data. They even came up with their own ideas of how data could be utilized (Anderson-Lehman et al. 2004). In other words, the question with the

data should be changed from “give me the information I want” to “help me to do better business-decisions”.

Widening the effects and possibilities of analytics in the business process, “solutions can go beyond customer-centric applications to support sales, marketing, supply chain visibility, price optimization, and workforce analysis” (Kohavi et al. 2002). Managers and business decision-makers are starting to realize that data can provide a competitive advantage in sales and there are many applications where data can be utilized.

Moreover, achieving the very best business value – e.g. a better performance in sales – analytics “solutions have to produce results that are actionable, along with ways to measure the effects of key changes” (Kohavi et al. 2002). For example, showing with mapping how data rows in spreadsheet can be turned into an informative visualization of where the salesmen should be placed to achieve the best possible sales results.

3. MATURITY MODELS

3.1 Maturity models in general

Maturity models at their simplest are theory approach which provides a framework for companies to understand where they are, where they have been, and where they want to be in the future (Halper & Stodder 2014) in a measured area. Maturity models can be used to determine for example process (De Bruin & Rosemann 2005), IT (Paulk 1993), human (Curtis et al. 2009) and analytics (Cosic et al. 2012; Halper & Stodder 2014) maturity.

Today, “organizations continually face pressures to gain and retain competitive advantage, identifying ways of cutting costs, improving quality, reducing time to market and so on, become increasingly important” (De Bruin et al. 2005). To tackle the problem, maturity models have been developed to assist companies in this objective. Maturity models have been designed to define the maturity (i.e. competency, capability, level of sophistication) of a selected topic based on a more or less comprehensive set of criteria. The most popular way of evaluating maturity is a five-point Likert scale from 1 to 5, in which 5 represents the highest level of maturity. (De Bruin et al. 2005; Mettler 2009)

During the years, according to Becker et al. (2009), maturity models in IT management have proved to be an important factor as they enable a better positioning of the organization and help find better solutions for change. In addition, maturity models may be understood as creations which serve to solve the problems of determining a company’s current state of its capabilities and deriving actions for improvements.

Kohlegger (2009), in turn, writes about different ways of using maturity models. He states that it is also important to understand that maturity models can be either used in a descriptive way, explaining changes observed in reality, or in a normative way. In the normative way, the model is intended to guide owners’, managers’ or other committed individuals’ interventions into making changes in maturity of maturing elements more effective or efficient.

Studies have shown that there are more than a hundred different maturity models available (Anderson-Lehman et al. 2004; De Bruin et al. 2005). There are no research of whether most of them are descriptive or normative, but what is characteristic for maturity models is that they usually aim in developing and gaining competitive advantage. Therefore it can be argued that normative maturity model provides a better impact while heading to a change.

According to a Cosic et al. (2012), there are two maturity models that have been widely used by researchers. Those are Nolan's (1973) stages of growth model and Paulk et al.'s (1993) Capability Maturity Model (CMM).

Moore (2014) presents that maturity models tend to have three common set of components: dimensions, level of maturity and attributes (see table 1). Dimensions are the complete set of topics that will be reviewed, which are mostly related to process, people and technology, but other topics are also involved. When it comes to maturity levels, they can range from 4 to 7 but, 4 or 5 are the most used. The attributes, in turn, are especially critical descriptions about the dimension's requirements at the specific maturity level.

Table 1. *Maturity model components in general*

	Dimension 1	Dimension 2	...	Dimension y
Maturity level 1	<i>Attribute 1.1</i>	<i>Attribute 1.2</i>	...	<i>Attribute 1.y</i>
Maturity level 2	<i>Attribute 2.1</i>	<i>Attribute 2.2</i>	...	<i>Attribute 2.y</i>
...
Maturity level x	<i>Attribute x.1</i>	<i>Attribute x.2</i>	...	<i>Attribute x.y</i>

While defining the attributes, it is very important to provide an accurate and complete characterization. As Moore (2014) mentions, one of the most common pitfall in maturity models is the lack of shared understanding of every attribute. In other words, while attributes are not carefully defined, there will be a room for different misunderstanding of the attribute, which may result in a poor outcome. In case that attributes, in turn, are accurate and complete, the model can provide a common language of the topic as a whole and therefore result in very positive outcome while aiming to increase the maturity level.

3.2 Building a maturity model

There are as many ways to build a maturity model as there are existing maturity models. Over the years, it has been researched what are the archetypes of steps that has to be taken while building a meaningful maturity model. Throughout the researches, it seems that there are few critical steps that recur on the most used building processes of the maturity models. Also it is noticeable, that all of the process models are not iterative. Usually iterative process models are in connection with normative maturity models. In turn, non-iterative models are basically linked to descriptive maturity models.

Developing maturity models means “finding solution patterns for important unsolved problems or giving advice in solving problems in more effective or efficient ways” (Hevner et al. 2004). In the following paragraphs, four popular maturity model development processes are introduced. As it will be noticed, there are a lot similarities but also every model has its characteristics.

Mettler (2009) presents that the complete development cycle for maturity model consists of four phases: (1) define scope, (2) design model, (3) evaluate design, and (4) reflect evolution. First, the focus of the phenomenon to be investigated is set by either choosing a generalistic or a more specific subject-matter approach.

After setting the scope, the actual maturity model is built in the second phase. Mettler stresses that it is extremely important to have a clear understanding of what is meant by maturity. Through this clear and unambiguous clarification of maturity, the goal of the model, what is the current and target state and how to achieve better maturity, is clear for everyone. In addition, it is important to consider whether the progress of maturity is one-dimensional (i.e. solely focusing on one target measure like efficiency) or multi-dimensional (i.e. focusing on multiple, sometimes divergent goals or competitive bases). In this phase, also the nature of the design process has to be determined (theory driven, practitioner-based or combination of these). It depends on the situation which approach should be selected. (Mettler 2009)

In the evaluation phase, validation and verification of the designed maturity model is considered. Verification is extremely important as it has to be clear that maturity model measures the correct factors and takes into account as many factors as possible. Validation is, in turn, the state to which maturity model answers to the presented research question. (Mettler 2009)

Reflecting the evolution -phase is about adjusting the maturity model for further usage. As the time changes, maturity model should be refaced by modifying the attributes (the criteria that have to be met in order to achieve a certain maturity) and possible changing the dimensions (areas that have an effect on the topic). In this phase, it is also decided how the model is developed on. (Mettler 2009)

Becker et al. (2009), in turn, propose a procedure model that includes eight phases for developing a maturity model. Model starts from problem definition, which is mandatory step for maturity model development. Next, a comparison to existing maturity models is done. This enables taking all the good things from the previous models and at the same time avoiding the pitfalls that those models faced.

In phase 3 the design strategy is determined. The most common strategies that can be identified are designing the completely new model, utilizing existing model (e.g. CMM) and then customizing it or combination of several models into a new one. The central phase of the procedure model, phase 4, is the iterative maturity model development. This

is the phase where the actual model is built. Phase 4 is divided to sub-phases, which are selecting the design level, selecting approach, designing the model section and testing the results. Phase 4 is iterative and repeated as long as the model is suitable for the research. (Becker et al. 2009)

Next phase is conception of transfer and evaluation, where the different forms of result transfer for the academic and the user communities need to be determined. In other words, the evaluation of which results can be used in improving maturity in the real world. After the phase 5, implementation of the transfer media is done. The purpose of the phase 6 is to make the maturity model accessible in the planned environment. (Becker et al. 2009)

Last step in the Becker et al. (2009) development model is, not surprisingly, the evaluation. Evaluation should reveal whether the maturity model provides the projected benefits and an improved solution for the defined problem. In this phase, the defined goals are also compared with real-life observations.

According to De Bruin et al. (2005), a generic framework for a development of maturity model (from business process management point-of-view) is a six-step process. Model's development phases are: scope, design, populate, test, deploy and maintain. They stress that even the phases are quite generic, their order is important. Skipping or changing the order may result to incomplete outcome and may occur other challenges as well.

First, the maturity model's scope is to be determined. Determining the scope of the desired model will set the borders for the model application and use. In the first phase it is also decided which is the focus of the model. According to De Bruin et al. (2005), "focusing the domain will distinguish the proposed model from other existing models". Second phase concentrates on determining a design or architecture for the model that forms the basis for further development and application. The design of the model incorporates the needs of the planned audience and how these needs will be met. Needs are reflections of "*why* they seek to apply the model, *how* the model can be applied to varying organizational structures, *who* needs to be involved in applying the model and *what* can be achieved through application of the model". Model is well built if it has a good combination of simplicity and recognized theory background. (De Bruin et al. 2005)

In the third phase – populate – content of the model are to be decided. It is crucial to identify *what* needs to be measured while determining the level of maturity and *how* it can be measured. In this phase, dimensions (factors that have an effect on the topic) are carefully set, as well as the amount of maturity levels and attributes (what it needs to be in the specific level of maturity). Sometimes it is not possible to lean on only for the existing literature while defining the dimensions, and therefore for example workshops can be used. After populating the model, it has to be verified by testing the relevance. In the phase 4, it is important to test the model thoroughly, especially its construct and its instruments for validity, reliability and generalizability. Pilot interviews, for example, can

be used to pre-test the survey instrument. Aim of the testing is to ensure the relevance of the survey and providing appropriate examples within the organization. (De Bruin et al. 2005)

Once the population and testing is done, the model has to be made available for use and to verify the extent of the model's generalizability. In the deploying phase, organization is putting the model to use and starts implementing the results. This, however, should not be taken for granted. Situations where the organization has paid the model, it is much easier to start deploying the model, but in the companies where model comes from outside of the organization, it may require a lot arguments to start deploying the model. After the deployment, maintaining starts. In the sixth phase, continuous development is a prerequisite to while heading towards a cumulative benefits. As the authors of the model argue, the continued relevance of a model will be ensured only by maintaining the model over time. (De Bruin et al. 2005)

All in all, the above-mentioned models have a lot common features, but also some own characteristics. In the table below, summary and comparison of the development models is presented.

Table 2. *Summary and Comparison of the Development Models (De Bruin et al. 2005; Mettler 2009; Becker et al. 2009)*

Model /Steps	Mettler (2009)	Becker et al. (2009)	De Bruin et al. (2005)
1	Defining the Scope	Problem Definition	Scope
		Comparison of the Existing Models	
2	Designing the Model	Determination of the Development Strategy	Design
		Iterative Maturity Model Development	
3		Conception of Transfer and Evaluation	Populate / Test
4	Evaluation of the design	Implementation of Transfer Media	Deploy
5	Reflect Evolution	Evaluation	Maintain
6		Rejection of Maturity Model	

As it can be concluded from table 2, models are somewhat similar. Therefore, it can be stated that the most critical phases in developing a useful maturity model are defining the scope, designing the model, testing it, implement it and keeping the model up to date by continuously maintaining the model over time.

3.3 Maturity models in analytics

Even though maturity models are relatively new in analytics, there is still some advanced models available. Cosic et al. (2012) have identified 14 unique analytic-related maturity models. Giving a quick overview, one of the earliest model is Watson's (2002) prescriptive data warehouse maturity model, which covers technology, people and processes with three-level classification, while Davenport and Harris (2007), presented a prescriptive analytics maturity model including five stages. Other models are also developed, but according to Cosic et al. (2012) they lack in theoretical background. This was a motivator for Cosic et al. (2012) to develop a model which has a strong academic background but at the same has a business-development value.

After Cosic's et al. (2012) research, some other models have been invented. One model that has gained ground is Halper and Stodder's (2014) analytics maturity model, which consists of five dimensions and five stages. To pointing out, Cosic's et al. (2012) and Halper & Stodder's (2014) models have some similarities and are a good combination when it comes to analytics maturity models.

Speaking of maturity levels, it can be seen that in analytics-related models are usually five-staged models (e.g. Hedin et al. 2011; Cosic et al. 2012; Halper & Stodder 2014; Moore 2014). It seems to be a common practice, only varying the names of the levels. However, the variation is a lot larger in the dimensions, although many similarities can be found from there as well. A common factors appear to be technology, governance and people. After the three basic dimensions, there are usually at least one more dimension brought up. Dimensions that are also mentioned and used in maturity models are culture, data management and organization. Next, some widely recognized models are presented, compared and analyzed in order to get a view of maturity models in analytics.

Analytics maturity model made by TDWI's directors Halper and Stodder (2014) is a model developed for guiding IT and business professionals on their path to analytics. It provides a "framework for companies to understand where they are, where they've been, and where they still need to go in their analytics deployments". Model consists of five dimensions: organization, infrastructure, data management, analytics and governance. Organization is about to what extent do the organizational strategy, culture, leadership, skills, and funding support a successful analytics program. Infrastructure is more of IT and architecture and how these support analytics.

Data management, takes a look how the company manage its data in support of analytics. At the same, data quality and processing, as well as data integration and access issues should be considered. Analytics, in turn, is a concept of how advanced the company is in its use of analytics. This includes the kinds of analytics utilized and how the analytics are delivered throughout the organization. Lastly, governance is about how coherent the company's data governance strategy is in supporting its analytics goals. A figure below present the dimensions in a visual format (Halper & Stodder 2014)

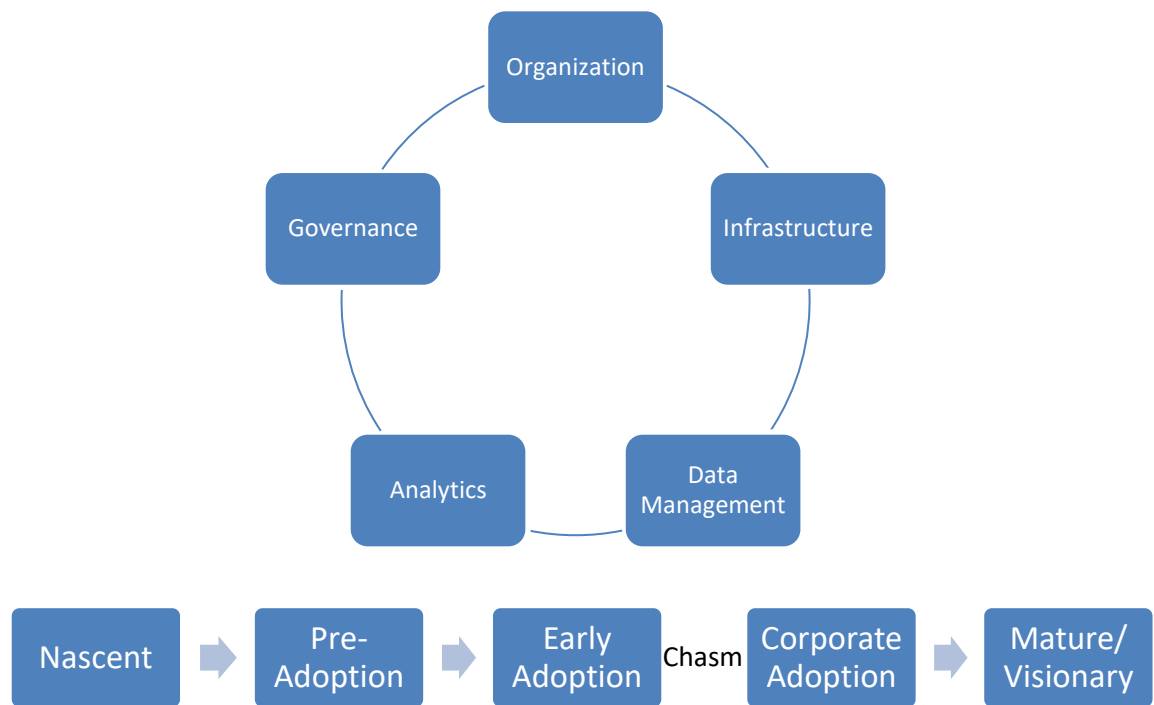


Figure 1. Dimensions and maturity stages by Halper & Stodder (2014)

Halper & Stodder (2014) have set a five-level maturity for their model. Maturity stages are named as 1) Nascent, 2) Pre-adoption, 3) Early Adoption, chasm, 4) Corporate Adoption and 5) Mature/Visionary, as the figure above shows. In a nascent state, most companies are not utilizing analytics, except perhaps for a spreadsheet program and the culture is not analytic. In other words, the culture is not data driven and decisions are made based on guts over the facts.

On the pre-adoption phase, “people are starting to understand the power of analysis for improving decisions and ultimately business outcomes”. Some investments in low-cost front-end BI or data discovery tool or a back-end database may be done. Next, in the early adoption state, companies are putting more money and resources to be analytic-driven company. Usually company starts using more advanced BI-tool in creating dashboards with predictive features. (Halper & Stodder 2014)

After early adoption state, Halper & Stodder (2014) have identified the Chasm which occurs when trying to move from early adoption (3) to corporate adoption (4) state. They describe it as following: “As organizations try to move from early adoption to corporate adoption and extend the value of analytics to more users and departments, enterprises must overcome a series of hurdles. This is often why they spend a large amount of time in this phase”. Five challenges – hurdles – have been defined: funding, data management and governance, skills sets, cultural and political issues, and governance.

If a company can overcome with the challenges, it can achieve a corporate adoption state, in which users typically get involved in the analytics and it transforms the way they do business. Decisions are mostly done based on data and information rather than guts and feelings. Culture is mostly analytic and people understand the benefits gained from data. (Halper & Stodder 2014)

According to Halper & Stodder (2014), only few companies are on the fifth level today. In a mature/visionary state company is using its analytics-related systems very well and the infrastructure behind the scenes is well-established. Data government is excellent and data is available for the right persons at a right time and on the right place.

Other widely known model is Davenport & Harris (2007) BA maturity model. They have identified three main dimensions that have an effect on analytics: organization, people and technology. Organization is divided in two sections, analytical objective and analytical process. People, in turn, includes analytical skills, sponsorship and culture. Levels are 1) analytically impaired, 2) localized analytics, 3) analytical aspirations, 4) analytical companies and 5) analytical competitors. Figure 2 shows the maturity model as a whole.

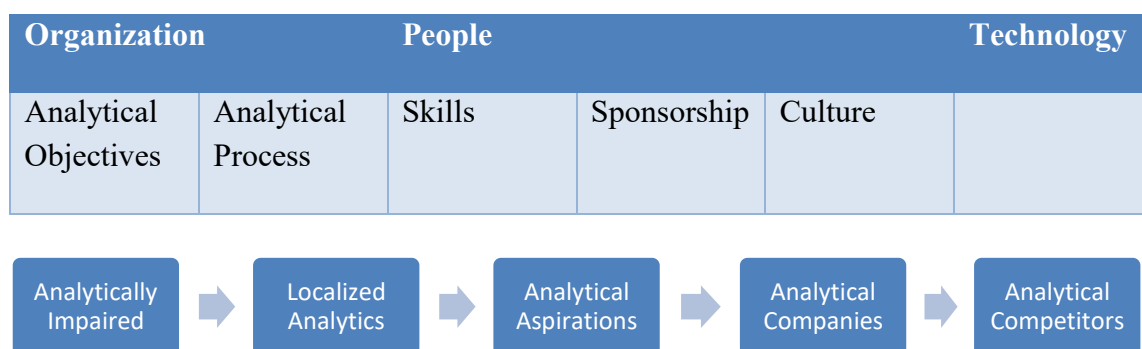


Figure 2. Dimensions and maturity levels by Davenport & Harris (2007)

On the first level, organization has some data available and management is interested in analytics. Technology for systematic analytics is usually missing, as well as people skills in analytics. On the second level, middle management starts deploying analytics and gets the top management’s attention. On the analytical aspirations phase company’s top management is committed to analytics by providing resources and composing a road map for gaining analytical skills. If a company is on the analytical companies -level, it usually has a corporate level analytics-functions. Top management sees analytical capability as one

of the most important resources. Lastly, on the fifth level, company gains benefits from its analytics skills and focuses on continuous development of its analytics. (Davenport & Harris 2007)

Davenport & Harris (2007) sees two paths in becoming an analytical company. These two routes differ in top management's sponsorship. If the path is sponsored well by top management, it is possible to skip the phase 2 and jump from level 1 straight to level 3. The other route is "evidences first", where middle management shows that analytics are an asset and therefore convinces the top management to provide resources. The evidence first -route, according to Davenport and Harris, is usually 1-3 years slower than top management-supported route.

In the next part, business analytics capability maturity model (BACMM) (Cosic et al. 2012) is presented more deeply, as it is the model that is later customized to the target organization's needs. However, the customized maturity model, presented in the part 4.2, includes elements of many other maturity models (e.g. Davenport & Harris (2007) and Halper & Stodder (2014)), but BACMM have had the biggest influence when it comes to building the customized model.

3.4 Maturity model applied to research scope

Cosic et al. (2012) have developed a theoretically based Business Analytics Capability Maturity Model (BACMM) that gives "a holistic view of BA, including technology, people, culture and governance". BACMM can be categorized as a prescriptive model. Prescriptive maturity model has development elements as it includes suggestions how to improve the maturity in every dimension.

Capabilities in maturity model can be conceptualized as hierarchies with high-level capabilities comprising to lower level capabilities. High-level capabilities represent the dimensions of the maturity model. Each of dimensions has four low-level capabilities, which are ranked by levels 1-4. In total, sixteen low level BA capabilities were identified from an analysis of the IS literature (Cosic et al. 2012). Table below shows the definitions for each of the BA capability areas.

Table 3. *Framework for Business Analytics Capabilities (Cosic et al. 2012)*

Governance	Culture	Technology	People
Decision Rights	Evidence-Based Management	Data Management	Technology Skills and Knowledge
Strategic Alignment	Embeddedness	Systems Integration	Business Skills and Knowledge
Dynamic BA Capabilities	Executive Leadership and Support	Reporting and Visualization BA Technology	Management Skills and Knowledge
Change Management	Flexibility and Agility	Discovery BA Technology	Entrepreneurship and Innovation

While determining the BACMM, Cosic et al (2012) uses five level maturity model combined with table 3 BA capabilities framework. A five level scale is applied in various existing maturity models (De Bruin 2009; Halper & Stodder 2014). Scale is defined in the table 4 and is then applied to each of the sixteen BA capabilities.

Table 4. *The five-level maturity scale (Cosic et al. 2012)*

<i>Level 0</i>	Non-existent: the organization does not have this capability.
<i>Level 1</i>	Initial: the capability exists but is poorly developed.
<i>Level 2</i>	Intermediate: the capability is well developed but there is much room for improvement
<i>Level 3</i>	Advanced: the capability is very well developed but there is still a little room for improvement
<i>Level 4</i>	Optimized: the capability is so highly developed that it is difficult to envision how it could be further enhanced. At this point the capability is considered to be fully mature.

After maturity models being assigned to each low-level BA capabilities, those results can provide an aggregated measure for each of the four high-level capabilities. (Cosic et al. 2012)

To concretize, determining a state of Governance capability of an organization, low-level capabilities can be classified to be the following: level 4 in Decision Rights, level 3 in Strategic Alignment, level 1 in Dynamic BA Capabilities and level 4 in Change Management. The aggregated result of low-level capabilities is 12, which is then divided by the amount of capabilities counted. In other words, taking the average of low-level capabilities, which results the Governance capability to level 3.

Deploying this to other high-level capabilities, gives an overall picture of organizations current state of utilizing business analytics. To say, the “maturity model proposes that the higher the BA capability the more value and sustainable competitive advantage is reached by the organization” (Cosic et al. 2012).

In the following subparts, each of the high level capabilities is described and opened up including the definitions of low-level capabilities concerning the particular capability. Definitions also contains what the high-level dimension is not and what it is not taking into account. This, in turn, clears the definition and it is easier to understand the dimension as it is. Definitions of the low-level capabilities are condensed parts from Cosic et al. (2012) research.

Technology

Technology dimension refers to the development and use of hardware, software and data within BA activities (Cosic et al. 2012). This includes the seamless integration of BA systems with other organizational information systems (Kohavi et al. 2002), the conversion of data into information through reporting and visualization systems (Watson 2002), and the use of more advanced statistical analysis tools to discover patterns, predict trends and optimize business processes (Negash 2004). Technology also covers unified architecture and data gathering from external and internal sources.

However, the connections between other dimensions are minimized in order to avoid causalities, which, in fact, enables easier independent improvement in technology dimension.

Data Management: critical part of success in BA is management of an integrated and high quality data resource. Data management includes three main sections: 1) data extraction from operative systems and transforming data to meet information requirements (Watson & Wixom 2007), 2) data capture from multiple channels from many business functions and external third party sources (Howson 2007), and 3) data integration with historical data in shared common repository (Watson & Wixom 2007). (Cosic et al. 2012)

Systems Integration: Full integration of operational and BA systems in order to utilizing the maximum capabilities of both systems (Myerson 2001). Achieving this, BA systems should be an important part of organization’s integrated information systems, without isolation and siloes (Shanks & Sharma 2011). (Cosic et al. 2012)

Reporting and Visualization BA Technology: The development and utilization of reports, dashboards and data visualization technologies to display the information in a format that is readily understood by managers and other business decision-makers (Watson & Wixom 2007). These technologies are usually used to address routine problems, where decision-makers understand the nature and structure of problems well and have specific questions in mind (Shanks et al. 2012). (Cotic et al. 2012)

Discovery BA Technology: The development and utilization of statistical and data mining software applications to explore data and identifying useful trend and correlations and extrapolating them to forecast what is likely to happen in the future (Negash 2004). The users of this technology are typically technical specialists rather than business decision-makers (Davenport et al. 2010). These technologies are usually used in less structured problems, where decision makers don't have specific questions and outcomes can be surprising (Shanks et al. 2012). (Cotic et al. 2012)

Governance

Governance is everything that refers to managing and keeping up data and information in the organization. Governance is managing the use of BA resources within an organization and the assignment of decision rights and accountabilities to align business analytics initiatives with organizational objectives (Weill & Ross 2004). It is also integrating the data with existing historical data in a central repository e.g. data warehouse (Watson & Wixom 2007).

Governance is also responsible for structured database for organization's data. It includes the management of an integrated and high quality data resource (Davenport & Harris 2007) and continuous renewal of BA resources and organizational capabilities in order to respond to changes in dynamic business environments (Collis 1994; Shanks & Sharma 2011). In addition, governance takes into account policies and processes related to data. This includes naming ownerships for data and planning suitable accesses to data.

Decision Rights: the assignment of decision rights and accountabilities, by determining those who are responsible for making each kind of decision, those who will provide input for the decision and how these people will be held accountable (Cotic et al. 2012). This will ensure that the right decision is made by the right person at the right level at the right time, and ensure desirable behavior the way BA is used throughout the organization (Weill & Ross 2004).

Strategic Alignment: the alignment of an organization's BA initiatives with its business strategy. It is largely determined by the level of understanding that exists between the managers responsible for an organization's BA initiatives and those responsible for shap-

ing the organization's overall strategy. The level of understanding is predominantly determined by the quality of communication that takes place between these parties and the level of trust that exists between them (Luftman 2004). (Cosic et al. 2012)

Dynamic BA Capabilities: the continuous renewal of an organizations' BA resource base and organizational capabilities while responding to changes in dynamic business environments (Collis 1994; Shanks & Sharma 2011). It involves identifying potential BA opportunities (Search), prioritizing those opportunities based on business need, risk and technology maturity (Select) and then funding and implementing the opportunities (Asset Orchestration) resulting in new and unique resource combinations (Shanks & Sharma 2011). (Cosic et al. 2012)

Change Management: managing people impacted by BA initiatives to accept and embrace technological and process changes (Anderson-Lehman et al. 2004). This includes the provision of training to demonstrate the value and utility of new practices resulting from change, in order to encourage people to adopt BA initiatives in their daily work (Negash 2004).

People

People dimension refers to all those employees in the organization who use BA as part of their job function. BA initiatives are considered to be knowledge intensive and require technical, business, managerial and entrepreneurial skills and knowledge (Davenport et al. 2010). Employees involved with analytics are everyone creating, handling or using that. Organizational challenge is to recruit personnel with the appropriate skill sets (Halper & Stodder 2014).

Appropriate skills sets also includes people skills in using technology and technical systems, such as enterprise resource planning system. This was excluded in Technology dimension due to avoiding interdependency.

Technology Skills and Knowledge: The skills and knowledge of BA technology specialists (Davenport & Harris 2007). These people typically have high capabilities in statistics and computing, and should also have some level of BA business skills and knowledge (Anderson-Lehman et al. 2004). (Cosic et al. 2012)

Business Skills and Knowledge: The skills and knowledge of BA business specialists, including sales, finance, marketing, supply chain and production business systems (Davenport & Harris 2007). These people typically have high capabilities in business and commerce, and should also have some level of BA technology skills and knowledge (Anderson-Lehman et al. 2004). (Cosic et al. 2012)

Management Skills and Knowledge: The skills and knowledge of management specialists, who are responsible for BA initiatives and projects throughout the organization (Davenport et al. 2010). This involves setting goals and key performance indicators, using the output from reporting and visualization technology to monitor performance, and taking the necessary action to ensure that project goals are met (Watson & Wixom 2007). (Cosic et al. 2012)

Entrepreneurship and Innovation: The skills and knowledge of technology, business and management personnel to use BA technologies to develop innovative and more effective processes and products that result in better organizational performance and create competitive advantage. It is enhanced through the provision of authoritative autonomy and financial independence, giving the freedom to pursue value-creating actions. (Sharma et al. 2010)

Culture

Culture dimension refers to the tacit and explicit organizational norms, values and behavioral patterns that form over time and lead to systematic ways of gathering, analyzing and disseminating data (Leidner & Kayworth 2006). It influences the way decisions are made (i.e. ad-hoc or fact-based), the proclivity for key performance indicators and quality measurement, the degree to which BA is enmeshed in daily business activities, the level of management support for BA (Davenport & Harris 2007), and receptivity to change (Hopkins et al. 2010).

This also considers an analytics culture and mindset in the organization (Halper & Stodder 2014), which enables analytics to be taken in to a managerial decision-making processes. Decision based on information should be stressed in every level of the organization. In line with analytic mindset, the willingness of using analytics is also part of this dimension.

Evidence-based Management: A culture where formal authority, reputation, intuition and ad-hoc decision-making are replaced by decisions based on data and quantitative analysis (Pfeffer & Sutton 2006). It requires key decision-makers to encourage their subordinates to actively participate in the development of a data-driven environment to support their own decision-making and problem solving efforts (Carte et al. 2005). (Cosic et al. 2012)

Embeddedness: The extent to which BA has become ingrained into people's values and daily work habits (Davenport & Harris 2007). It is how people value quantitative analysis and data-driven insights over guts and feelings. Are people routinely applying BA systems and tools in their daily tasks in figuring out the correct answers to make decisions (Shanks et al. 2012). (Cosic et al. 2012)

Executive Leadership and Support: The ability of the senior managers in the organization to generate a passion for BA and data-driven decision-making throughout the organization (Laursen & Thorlund 2016). This involves promoting the increased use of discovery BA technology, rather than simply relying on reporting and visualization BA technology (Davenport et al. 2010). (Cotic et al. 2012)

Flexibility and Agility: The level of change readiness within an organization. A culture of change readiness is especially important in rapidly changing business environments (Anderson-Lehman et al. 2004), particularly those which employ the use of real-time BA technology. (Cotic et al. 2012)

4. EVALUATION AND CUSTOMIZATION OF MATURITY MODEL

4.1 Target organization

Target organization is a global cargo handling solutions provider. Target organization's foundations lie deep in Scandinavian engineering expertise, yet the organization is made up of many great businesses from around the world. It has nowadays almost 6000 employees in 30 countries. Organization is part of larger corporation and it has also own sub companies operating in thinner markets.

Business typically consist of projects, as most of the solutions are unique for the customer. This, in turn, drives the everyday way of working in the organization, which has to answer to the upcoming challenges that project business generates. In other words, volatility is relatively high as few large orders can really change the environment.

Target organization stems from the time before World War II and after the several organizational changes and acquisitions it has formed to its current state. Company has gone through many changes caused by economic challenges and being able to grow again, organization have been forced to shape up its business model. Nowadays, the flow is towards the customer centricity and service-business, which sets challenges to a long-term engineering company.

Due to the upcoming changes in business environment, target organization is looking ways to improve its understanding about utilization of analytics. Business is already taking first steps of using analytics, but bringing it up to managerial decision-making is seen challenging. Maturity model is chosen to tackle the problem: it gives an overview of the current state of sales analytics utilization, the desired state and a roadmap towards the desired state.

4.2 Customization of maturity model

As stated in part 3.2, there are many theoretical approaches when it comes to customization of maturity model. In this thesis work, model customization is made by following Mettler's (2009) method. Method is argued to be suitable for relatively mature phenomenon (Hautala 2017), which analytics is. Hautala (2017) mentions that virtual reality and cryptocurrencies are examples of the non-mature phenomenon.

In general, maturity models presented in literature are built as theoretical models, which means that the model has to be customized in order to use it efficiently for practical challenges set by target organizations. In sales analytics, literature has few theoretical models

(see, e.g. Cosic et al. 2012; Halper & Stodder 2014), which can be used as a basis while building a customized maturity model. In other words, building a customized model requires a theoretical model, which is somewhat close to the desired model, and then a plan how to make the model suitable for the particular challenge.

Even though it sounds simple, there are many things that have to be considered while customizing the model. It all starts from finding a process, which is then followed. In this, the model already exists, and process can be started accordingly to the process model. Mettler (2009) states that there are four main phases in maturity model customization (also presented in part 3.2): define scope, design model, evaluate design and reflect evolution. The more precise presentation of the considerable parameters are shown in table 5 (page 30).

The customization process started by having a meetup with target organizations representatives, where the focus was first presented. Focus were set to be improving the utilization of organization's sales analytics. Therefore, in Mettler's (2009) model, defining the scope is set to be specific issue. Choosing a "specific issue" usually requires a customized maturity model as the literature does not have a model for every specific challenges.

Level of analysis were set to "organizational considerations" by the target organization as the desired scope is understanding of the whole organization's capabilities in improving utilization of sales analytics. On the contrary, it does not make sense to improve utilization in one group while aiming to an organizational solution.

In defining the "novelty", it is considered whether the phenomenon is new or mature. In the case of sales analytics, topic is relatively mature, but can also be stated as emerging. Target organization sees the sales analytics more emerging than a fully mature, and therefore the stress is in "pacing".

Audience has both management and technology orientation. In other words, the model is not tailored for just management or technology needs. Lastly in defining the scope, dissemination is set to "open".

After having defined the scope, the customized model were designed. The customization were done in the workshop with the target organization's representatives. In the workshop, it was discussed what kind of focus the model should have, what is the goal, how the design is made and who are the respondents while defining the current and target state.

Table 5. *Decision parameters during maturity model development (Mettler 2009). Parameters that are taken into account in customization are presented in blue*

Phase	Decision Parameter	Characteristics			
Define Scope	Focus /Breath	General Issue		Specific Issue	
	Level of Analysis / Depth	Group Decision-making	Organizational Considerations	Inter-organizational Considerations	Global & Societal Considerations
	Novelty	Emerging	Pacing	Disruptive	Mature
	Audience	Management-oriented	Technology-oriented	Both	
	Dissemination	Open		Exclusive	
Design Model	Maturity Definition	Process-focused	Object-focused	People-focused	Combination
	Goal Function	One-dimensional		Multi-dimensional	
	Design Process	Theory-driven	Practitioner-based	Combination	
	Design Product	Textual Description of Form	Textual Description of Form and Functioning	Instantiation (assessment tool)	
	Application Method	Self-assessment	Third-party Assessment	Certified Professionals	
	Respondents	Management	Staff	Business Partners	Combination
Evaluate Design	Subject of Evaluation	Design Process	Design Product	Both	
	Time-frame	Ex-ante	Ex-post	Both	
	Evaluation Method	Naturalistic		Artificial	
Reflect Evolution	Subject of Change	None	Form	Functioning	Form and Functioning
	Frequency	Non-recurring		Continuous	
	Structure of Change	External / Open		Internal / Exclusive	

Focus were set to “combination”, with having mostly object and people focus and partly process focus. Goal wanted to be multi-dimensional, where every dimension is important. Design process had both theory-driven and practioner-based elements. Product design is an assessment tool, which can be used to define the current and target stages. Respondents were persons from both management and front-line.

In the workshop, the dimensions were defined. At first, there were 8 dimensions that were found from the literacy, main sources being Cosic’s et al. (2012) and Halper & Stodder’s (2014) analytics-related maturity models. As the dimensions were looked more closely, there were some similarities and overlapping with the dimensions. On the workshop, dimensions were combined and some even left off. As a result, four main dimensions were defined as being the factors having effect on the better utilization of sales analytics. The defined four dimensions included a combination of the all eight dimensions.

After the workshop, where dimension were set, the attributes had to be defined. According to Mettler (2009) it is extremely important that everyone understands what it means to be on the certain level of maturity. A lot resources were used in defining the attributes for every level of the every dimension, for example what it means to be on the level 3 in technology. Main sources for defining the attributes were, discussions with target organization’s representatives and writers own knowledge, which was then supported by the relevant literacy (see, e.g. IBM 2010; Kiron & Shockley 2011; Cosic et al. 2012; Halper & Stodder 2014).

Attributes, as well as definitions of the dimensions, were fully customized. While defining the attributes, there were factors that required a lot knowledge of the target organization’s technologies, processes, human resources and its culture. Defining the attributes to a form where it is possible for everyone to understand those, was a challenging tasks, and it can be seen as one of the main achievements of the thesis work. Fully customized dimensions and attributes are presented in the part 4.3.

After the customization, model evaluated should be made. In the subject of evaluation, the focus were set to both testing the model and testing the process, with stressing a bit more for the model testing. In timely manner, the model and process were tested before and after the model was made, focusing a little more for testing afterwards. Evaluation method were naturalistic.

The customized method were, especially, tested with test interview with target organization’s employee. Test interview were worth it, since it revealed some improvement points for the model. The model was then iteratively customized before the interviews.

Lastly, reflect of evolution were considered. With the target organization it was defined that, in the frames of thesis work, evolution is not being made. But for the future, company states that the model and its evaluation method both will be further developed. Therefore, for subject of change, a “form and functioning” is chosen.

Frequency, in turn, is set to non-recurring. There are plans to have some kind of recurring, but at this moment, non-recurring is chosen. Structure of change is “external/open” since all the steps of the model and its development is well documented, which enables anyone to improve and develop it further.

4.3 Customized maturity model

In table below, customized maturity model for target organization is presented. Dimensions are named same as in BACMM, but are not fully similar in their definitions regarding to the BACMM model.

Table 6. *Customized maturity model for target organization*

Level	Technology	Governance	People	Culture
1				
2				
3				
4				
5				

The chosen maturity model, referring to the previous chapters, BACMM should be customized to target organization’s needs. In order to get the best results, definitions of the dimensions are adjusted and customized with the help of target organization. As earlier mentioned, grounds were set to customization in workshop held in the early phase of the thesis process. After the workshop, some cumulative changes were made to finalize the definitions of the dimensions.

In some dimensions, however, quite major adjustments were made. Some important things for the target organization were not found from the BACMM model, but found from other model, which were then added to the definition of customized model. Also, BACMM included few things that were not seen relevant for target organization’s capability to utilize analytics and those were, naturally, left off. In addition, the customized definitions does not have one-to-one match to BACMM. For example, in customized model management of data resources is included in governance and excluded from technology, which were in the BACMM the other way.

In the upcoming sections, first paragraph is the definition for that particular dimension. The following paragraphs explain more deeply the definition, opening up the excluded and included themes from the dimension. Next, the levels of the dimension are presented from 1 to 5. As it is supposed, level 1 is the lowest maturity, while 5 being the highest.

Definition of a certain level identifies what it will take to get to the next level of maturity. Levels are partly cumulative, meaning that one cannot achieve high level if some low-level requisite is not met. For example, if requisites mentioned in level 2 are not met, the company cannot set its current state to level four even if some categories match to that level.

4.3.1 Technology

Suitability and operability of the main systems related to sales analytics, and their integration to make utilizing analytics possible. Data gathering and storing to systems and the use of data from the systems. Place, where data and information can be stored and tools that enables the usage of data.

Technology dimension is not about the use of systems: it is taken into account in Culture dimension. In addition, technology does not include management of data resource, which is covered in Governance. Technology is partly connected with other dimensions as well, since technology cannot be separated totally from any of those.

Level 1: Existing, but separate, CRM and ERP systems. Data in siloes between several systems e.g. separate sales system and ERP. Data gathering fully manual without process, e.g. inserting data not part of sales process. Using data from the systems fully manual and ad-hoc based.

Level 2: Existing CRM and ERP with a rough action plan for integration. Data still in siloes between systems, but data still available for usage. Data gathering mostly manual, process incomplete, e.g. data inserted almost every time, but not as part of sales process. Using data from the systems mostly manual and ad-hoc based, e.g. using spreadsheets and static charts.

Level 3: Existing, and partly integrated, CRM and ERP. Data available mostly without siloes, systems work together partly. Data gathering is part of sales process and inserted partly automatically, e.g. most of data is inserted during sales process and part of data manually outside of sales process. Using data is partly automated, but mostly based on ad-hoc tasks. BI-tools are existed (e.g. QlikSense), but most of data utilization is still through spreadsheets.

Level 4: CRM and ERP integration mostly made. Data mostly available throughout the organization. Data gathering is part of sales process and most of data is inserted automatically and mostly consistent. Using data is mostly automated through shared BI-tools and apps, e.g. dashboards and automatically generated CRM report.

Level 5: Full CRM and ERP integration. Data gathering fully automated, consistent and part of sales process. Using data is automated through shared BI-tools, e.g. automatically updated customized dashboards and automatic CRM reports.

4.3.2 Governance

Data management and administration that enables sales analytics, including management of system integration, data ownership management, quality checking for data and processes related to data.

Governance exclude data capturing, which is taken into account in Technology dimension. Although, technology and dimension are slightly interdependent when it comes to data integration. Technology is more about what the systems are and how those are integrated, while Governance is about managing the integration itself.

Level 1: No processes or existing processes (storing, updating, using) only for easy data. Storing and data usage in making decisions fully manual and ad hoc-based. Naming data ownership is missing, updating data fully manual and not monitored. Poor data quality. CRM and ERP linkage is not part of sales process and it is not made for any accounts.

Level 2: Processes for data handling is somewhat existing, mostly for easy data. Processes possibly outdated. Data ownership is named, but responsible person is named manually without a process. Data updates are mostly ad-hoc based. Data quality usually mostly poor, but enables minor ad-hoc based analytics. CRM ERP linkage is not part of sales process, but is made manually for some accounts

Level 3: Processes for data handling mostly existed. Data ownerships are named and naming, including changes in responsible person, are partly done automatically as part of process. Data quality enables partly automated analytics through BI-tools (e.g. QlikSense). CRM ERP linkage is partly done for old accounts, and is manually done for new accounts.

Level 4: Processes for data handling existed and are up-to-date. Data ownership is named partly automatically as part of sales process. Data updates are made accordingly to the process and updates are partly monitored. Data quality enables systematic and comparable, partly predictive, analytics through shared BI-tools. CRM ERP linkage is part of sales process and is made for new accounts automatically and manually for some of the old accounts.

Level 5: Processes for data handling existed, updated and continuously monitored. Data ownership is named automatically as part of sales process and data is updated mostly automatically, according to the process and mostly monitored. Data quality enables systematic and comparable predictive analytics through shared BI-tools. CRM ERP linkage is part of sales process and is made for new accounts automatically and manually for every old account.

4.3.3 People

Employee's technical, business, managerial and entrepreneurial skills in using, exploiting and utilizing sales analytics and main systems related to sales analytics on various work tasks.

In addition, skills to read and understand analytics and skills of doing analytics in crucial in this dimension, depending on which side of analytics one is. However, this excludes the proper usage of systems, which is, in turn, included in Culture dimension. Proper usage is part of cultural assets, and organization is responsible of taking care of its employees and their way of using systems properly.

Level 1: Poor data literacy skills, e.g. easy charts cannot be understood and therefore information cannot be used in decision-making. Skills to do reports are poor, e.g. people have difficulties in creating charts in spreadsheets. Lack of skills in using systems, e.g. missing knowledge how to insert data to the systems.

Level 2: The basics of data literacy are existed, but utilizing understood data in decision-making is mostly missing. Skills to do reports is moderate and data can be visualized using tools available in spreadsheet software. Skills in using system is only moderate, but systems can still be somehow used though. Possibly common education and training is missing and not offered for individuals.

Level 3: Reports can be mostly read in the way that gotten information can be used in decision-making. Skills to do partly automated and dynamic reports, e.g. using BI-tools (QlikSense etc.). Data can partly be drawn into a form in which it has business-value. People have enough skills to use systems mostly properly, and training is provided if asked.

Level 4: Reports can be read very well and information gotten from reports can be used for mostly predictive decision-making. People can make mostly automated and dynamic reports using BI-tools effectively. Data can mostly be drawn into a form in which it has very useful business-value. People have enough skills to use systems properly and training for keeping up the skills is mostly provided proactively.

Level 5: Reports can be read very well and information gotten from reports can be used for predictive and long-term decision-making. People can make automated and dynamic reports using BI-tools very effectively. Data can be changed using BI-tools to very useful information that has a lot business-value. People have enough skills to use systems effectively. Continuous training is provided and it is part of process of keeping people's skills updated.

4.3.4 Culture

Existing tacit and explicit organizational norms, values and behavioral patterns towards sales analytics. Motivation and incentives in utilizing sales analytics, as well as proper usage of main systems related to sales analytics.

Culture includes proper use of technology and technological systems, which were both left off from Technology and People dimensions. These covers all business related systems, such as ERP and CRM, and business analytics systems, i.e. data handling and visualization systems. Organization should provide a cultural-base where systems are, and can be, used as planned and individuals are committed to use systems properly.

As mentioned in People dimension, Culture excludes people's skills of using analytics and therefore concentrates more on creating a mindset base, a way of working, where it is suitable, and recommended, to use analytics. Culture also leaves off the appropriate skill sets of individuals, which were included in People dimension.

Level 1: Negative attitudes towards data utilization. People doesn't see data as valuable asset, decisions are based on tacit knowledge and guts. Culture for sharing data is missing and data is in siloes. The culture for proper usage of the systems is missing, no common policy exists.

Level 2: Mostly negative attitudes towards data utilization. Decisions are partly based on data, but mostly done with using tacit knowledge and guts. Data, information and knowledge is seen as a personal asset and it is not shared, since knowledge is power. Culture for using systems quite properly. Common policy exists, but following the policy is mostly poor.

Level 3: Partly positive attitudes towards data utilization. Decisions are based partly tacit knowledge, history data and predictions that are generated ad-hoc based. Data is shared inside business lines and employees understand the benefit of sharing. Systems are mostly used right and accordingly to the policy. Monitoring the proper usage is still missing.

Level 4: Positive attitudes towards data utilization. Decisions are mostly based on data and predictions made from data. Predictions are generated using available data from internal and external systems. Predictions are also generated in automated process, not ad-hoc based. Data, information and knowledge is mostly shared effectively throughout the

organization, understanding the benefit of sharing. There are no crucial siloes in the organization. Systems are used properly and according to the organization's policy. Incentives for proper usage usually exists. Monitoring is being made, but mostly manually without a process.

Level 5: Very positive attitudes towards data utilization. Decisions are based on all available data, and prediction made from it. Data, information and knowledge is shared very effectively throughout the organization, understanding the cumulative benefit of sharing. There are no siloes in the organization. Systems are being used properly and according to the organization's policy. Incentives for proper usage exists and usage is monitored in monitoring process made regularly.

5. RESULTS

After having defined and built the customized maturity model, interviews were conducted in order to discover the target organizations' current and target stages of sales analytics utilization. Results from the interviews are presented next. First, result of the current state is shown in figures 3, 4, 5 and 6 and then results of the target state in figures 7, 8, 9 and 10. This part concentrates on the raw data gathered from the interviews. Part 6.1, in turn, presents the conclusions.

5.1 Current state of sales analytics utilization

Respondents' answers for the questions about current state of sales analytics utilization are partly presented in the following subparts. Respondents marked the current state (quantitative) and had a chance to comment their statement (qualitative). Some of the comments are presented to give an overview of the situation.

5.1.1 Technology

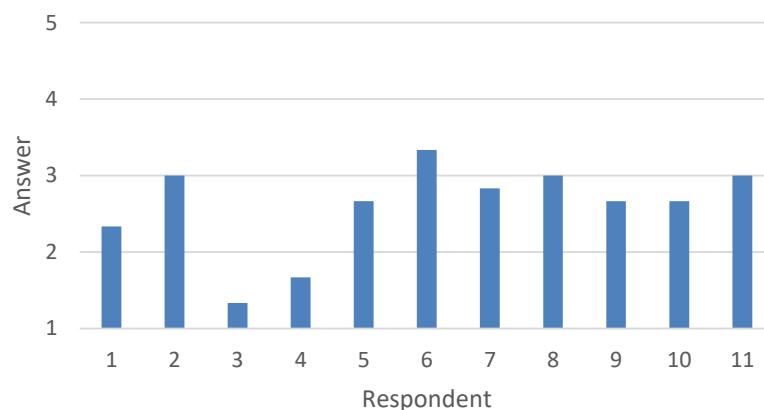


Figure 3. Current state of maturity in Technology dimension

Current maturity of technology were mostly seen to be between levels 2 and 3 (see figure 3). Respondents were asked to explain why he/she set the maturity to the particular level. Business Intelligence Manager stated that “Technological investments are already made” and therefore technology is not a bottleneck in utilizing sales analytics.

A Vice President of a business line mentioned, that data integration between ERP and CRM exists but it is not made for every account. This sets challenges. However, she sees that superior system integration is not meaningful when thinking profit over assets. Another Vice President commented that “we cannot yet analyze and doing analytics about our customers' gross profit as a whole”

CRM specialist specified, that CRM and ERP are partly integrated. Customers that are integrated are manually selected. In other words, linkage is done manually to some accounts and master data team does the linkage according to the business line's statements. Vice President of another business line, in turn, stated that master data team takes care of data being same in every system, but did not mention that business line has responsibility in data integration as well.

Speaking of data usage, a Controller of a business line mentioned that "we are taking an export out of CRM once a month and then perform the needed changes to get the report in the form it can be used and utilized". One of the Vice Presidents also mentioned the challenges in data usage "automatic report from CRM is always adjusted by 'CRM-multiplier' before it can be used for making decisions". CRM-specialist, in addition, stated that there is still a strong Excel-culture in the company.

One Vice President of a business line spoke about data availability in terms of using it: he usually does not find the latest sales figures, since those are sent him manually. He asks the latest report from Market Intelligence team, which then manually – and ad-hoc basely – updates the data and sends the spreadsheet to him.

One of the Vice Presidents was worried about systematic data usage, arguing that there should be a report or dashboard that can really be trusted. Now data comes off-cycle and ad-hoc based to decision-making. Senior sales manager, in turn, mentioned that people are speaking that data should be used more effectively in decision-making but it is not showing in allocated resources.

5.1.2 Governance

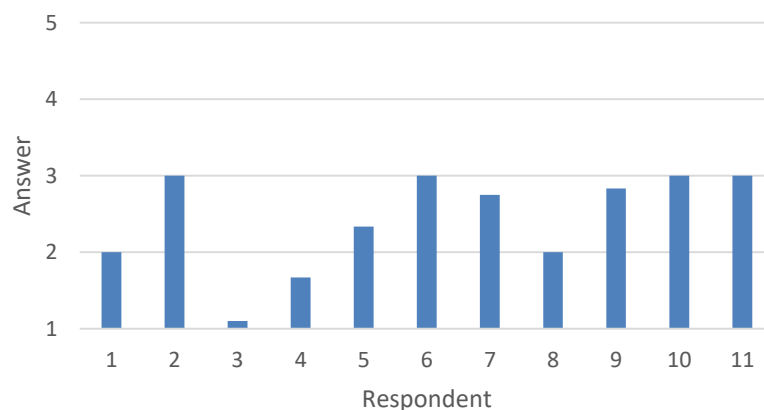


Figure 4. Current state of maturity in Governance dimension

Speaking of data governance, issues in data ownership were largely mentioned. "There is no named person in business-lines being responsible for data" said business-line Controller. Same were mentioned by a Vice President of one business line, "the ownership is kind of named, but the responsibility does not follow. There should be a clear definition

who is responsible for the data overall”. Another Vice President is very concerned about data ownership: “no-one knows who owns data”. When there is no owner, data may be outdated, incorrect or even not existing. Therefore data ownership have an effect on data quality.

One of the Vice Presidents mentioned that data quality has a negative impact on decision-making process since data cannot be trusted. Quoting the Business Intelligence Manager about the same matter: “the quality of analytics is equal to quality of data”. Related to data quality, Sales Director stated that “We do our best to keep CRM up to date with contacts and other pertinent account and contact info, but I am not sure if anyone is really monitoring or mandating this.”

Challenges ERP and CRM integration are noted in target organization. One of the Vice Presidents stated that “ERP and CRM integration is something in which we can improve a lot”. CRM specialist also highlighted issues in level of integration, but mentioned at the same that there integration does not have to cover all accounts. “When thinking about profit over assets, it makes no sense of linking some small accounts from the year 2013”.

Sales process were also discussed and one Vice President stated that sales process generates a lot data from customer, but it is not systematically gathered to CRM. He mentioned that data is scattered in many systems, thus setting challenges for data availability. This increase siloes and decrease data transparency.

“I would start from improving data governance, now it is not clear who owns the data, who is responsible for updating it and who is monitoring the data being correct” stressed one of the Vice Presidents.

5.1.3 People

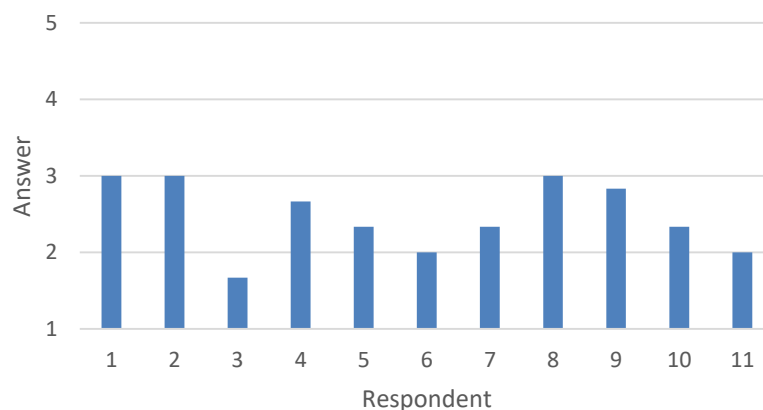


Figure 5. Current state of maturity in People dimension

In the target organization, answers about maturity in people dimension were mostly between levels 2 and 3 (see figure 5). A Vice President of a business line mentioned that he

thinks people know how to use systems correctly but the attitude to use them properly is another thing. The same was said by the CRM specialist.

According to another business line's Vice President, the "problem is not data literacy, but the quality of data. It is hard to believe in data and therefore data is not fully utilized in decision-making". Sales Process Manager, in turn, mentioned that data literacy is not a critical problem, and data can be read good enough. At the same, he stated that it is more about making the readable reports.

Speaking of reports, an Account Manager stressed that "in the big picture, we are not very good at utilizing BI-tools". This can be seen in the reports, which some of the respondents felt to be quite hard to read. One business line Vice President stated that reports should come automatically, and then a visualization expert (i.e. data analyst) can use few days to build a BI-tool where the automatically generated report can be seen in a visual format.

Despite of the training videos provided in CRM, Sales Process Manager sees that the training is not provided well, since it is not necessary to watch the videos. However, many respondents mentioned that the skills in using systems are existing, but it is more about the willingness and attitude of using systems properly.

According to regional Senior Sales Manager, "complicated system reduces willingness to insert data there [to CRM]". The same was stressed by another Vice President as he sees that there are too many systems and person cannot remember how to use all of them. There are no clear training and guidance for proper system usage, which has an effect on users' skills to take most out of the existing systems.

5.1.4 Culture

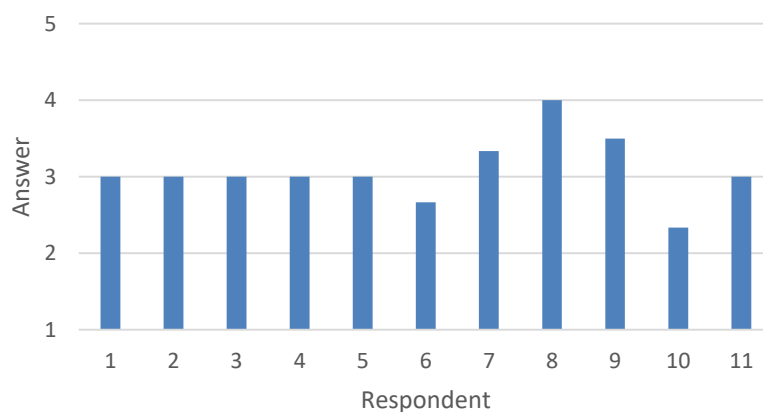


Figure 6. Current state of maturity in Culture dimension

Despite the culture mentioned to be a bottleneck by many respondents, it was still ranked to relatively high level (see figure 6). Respondents mentioned that the willingness to use systems in a proper way varies a lot. As one business line's Vice President stated, "it is not enough if half of the employees does it [a proper usage] well".

In some parts of the organization, it is acceptable use the systems poorly, for example inserting inconsistent data to CRM, or not even inserting it. Therefore the quality suffers, which has an effect on the attitude of utilizing data. "We are not monitoring proper usage of the systems" another Vice President added.

Third Vice President argued about the same by saying that people want to trust data but it is hard since data quality is poor. A business-line Controller had the same opinion as well. "We are doing a lot predictions and analyses but they are not done systematically as there is not a common database which is always used" added the Vice President. Therefore data used in predictions varies which causes that people using the predictions are having hard time to figure out what is included in this particular prediction and what is left off.

One Vice President of a business line mentioned that "as there is not a data source that everyone uses, reliability decreases". At the same, a business line Controller stated that if someone in the top-management does not trust to data, it has an effect on person's whole team – and even to their subordinates. Sales director, in turn, said that more and more data is available and we have relatively good systems to handle it, but the culture is not data-oriented.

The willingness for sharing data, according to Business Intelligence Manager, is periodical: when the business goes well, information is shared very well, but on the tough times, people tend to keep information themselves. On the other hand, a Sales Director said "I don't think everyone has to know everything" and added that data seems to be available well for those needing it.

In addition, one of the Vice Presidents said that "we are still a bit in siloes, we can be better in sharing information". On the contrary, front line salesperson mentioned that there is no critical siloes in the organization. The opinion seems to be in connection with the person's position.

5.2 Target state of sales analytics utilization

Respondents' answers for the questions about target state of sales analytics utilization are partly presented in the following subparts Respondents marked the current state (quantitative) and had a chance to comment their statement (qualitative). Some of the comments are presented to give an overview of the situation.

5.2.1 Technology

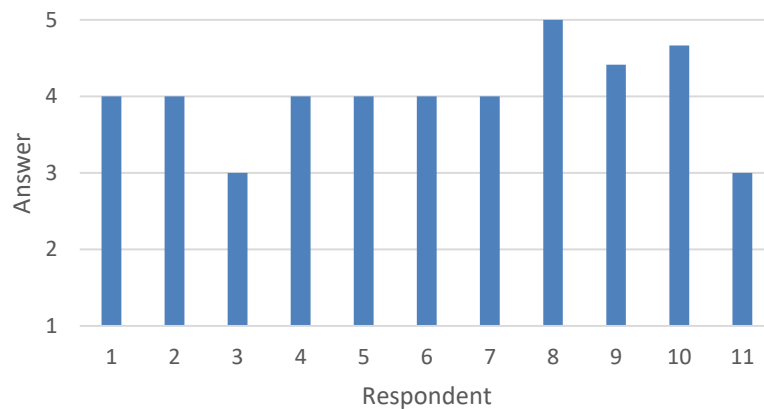


Figure 7. *Target state of maturity in Technology dimension*

Even though technology was not seen to be a bottleneck for utilizing sales analytics better, respondents still were able to draw meaningful improvement points. Senior Sales Manager argued that data integration should be better if target organization wants to predict sales better. Also it was argued by one of the Vice Presidents that BI-tools should be used more systematically in sales.

Speaking of improving integration between CRM and ERP, sales director mentioned that company should invest to “full integration to avoid unnecessary data duplication and additional reporting”. CRM specialist is having partly same opinion: “CRM and ERP are not integrated well in terms of sales analytics. Target state has to be five”. A Vice President of a business line is also stressing the integration. “CRM and ERP integration should be improved, now data is inserted twice or even more”.

Senior Account Manager mentioned data gathering in terms of improvement. “Inserting data to the system should be easier and existing tools should support it better”. One Vice President had a mutual approach, as he would like to see the newest features of CRM and ERP systems in order to take the most out of the data. Another Vice President saw that data is already gathered well and it is not a bottleneck at all. Regional Sales Manager had the same thoughts: “technology is not a problem, our CRM is a good system”.

5.2.2 Governance

Target state in governance was mostly set to level 4 or a bit higher (see figure 8). ERP and CRM linkage were seen very important by business line Vice Presidents, but in the front line the usefulness of linking were not seen critical. Vice Presidents of the business lines stressed that ERP and CRM linkage should be part of sales process and made for new accounts automatically. Also, the linkage should be done manually for a bit larger sample of old account than it is now.

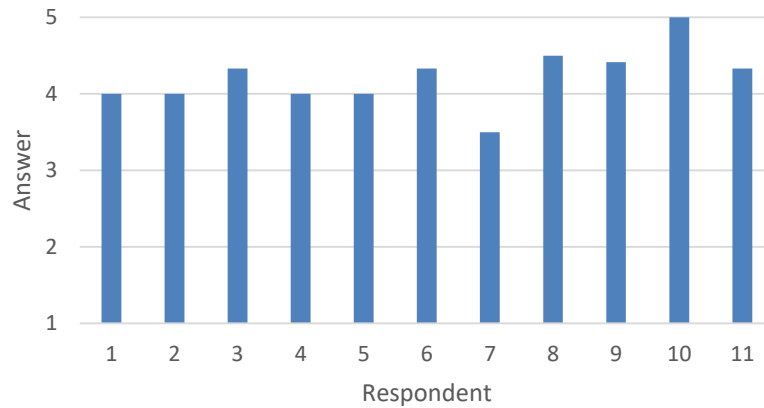


Figure 8. Target state of maturity in Governance dimension

One of the Vice Presidents stated that there are siloes between the CRM and ERP which is a challenge. Siloes should not exist and data integration would help in it. Also, how the useful data can be gotten to the right person at right time and a right way: only then the data can be utilized in decision-making. Another Vice President also mentioned that “data should be available better. Only available data can be utilized”.

Sales Director stressed that “CRM needs to be cleaned as there are duplicate accounts and duplicate contacts. Next, a real effort needs to be given to be sure the proper people have the proper rights to access and change data within accounts and contacts. Company should highlight the meaning of CRM so that people know why it is important”. When it comes to cleaning the CRM system, someone should take responsibility of CRM being up-to-date.

Senior Account Manager mentioned that data ownership should be better. He argued that as long as there are no clear owner for data, data quality will not improve. There should be processes for monitoring data quality. One of the Vice Presidents shared the same opinion: “There should be clear definitions who is responsible for data. This is the first thing I would start to improve”.

Sales processes were also discussed during the interviews. One of the Vice Presidents said that “target should be that processes related to data are up-to-date and generating systematic data”. Other Vice President – who is responsible of the sales processes – highlighted that “sales processes are currently under an update and those will be in better form soon”. In addition, a business line Controller saw that “sales processes exist and there are a named person who is responsible for updating those [sales processes]”.

When it comes to following and working according to sales process, a regional Sales Director sees that “one region is more advanced in sales process than other areas, this should be that every area is doing well”.

5.2.3 People

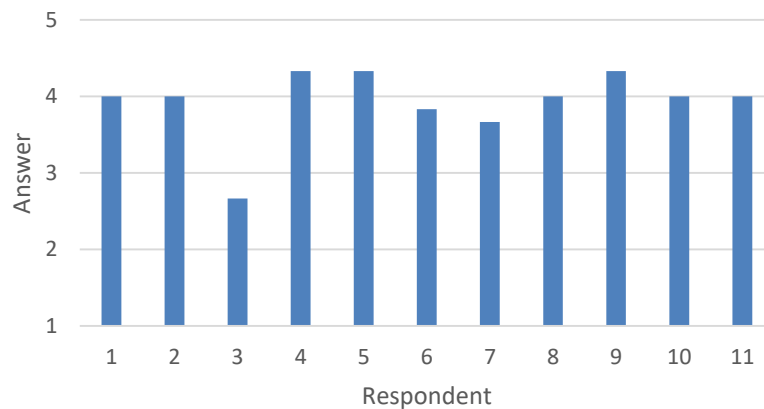


Figure 9. Target state of maturity in People dimension

Speaking of people, respondents had a quite mutual opinion that target maturity is nearby level 4. Only one respondent saw that lower maturity is enough. He argued that not everyone needs to use all the systems well and not everyone needs to have a high level in reading and creating reports. But, on the contrary, everyone needs to be good at something.

One Vice President of a business line said that the “target level should of course be 5, we can’t give advantage to competitors in this matter”. In turn, a CRM-application Manager stated that “even reaching the level 4 would need a lot since we are lacking in data literacy”.

A Sales Process Manager, in turn, stated that employees should be trained better for using the new and existing systems. “We can’t support users enough. That should be better in the future” he added. One of the Vice Presidents mentioned that “we should provide more training to CRM users. Common training that everyone uses the system same way”. Another Vice President argued the same with an online training vision: “online training for everyone using the CRM, it would help a lot”. Third Vice President added that “continuous training is the key for more systematic usage. Thus, ‘training’ comes automatically when people use the system on a regular basis.” CRM specialist is also mentioning the importance of training: “training should be provided regularly and in local language. Online training videos would be good”

However, a business line’s Vice President argued that the CRM system is very simple to use and it even guides the user to insert data in correct form and in the correct places. She also mentioned that the proper usage is more of a culture than a users’ skills issue. The same were stressed by other respondents: employees seem to have a knowledge of using systems mostly properly, but the culture gives space for misuseage.

A front line salesperson stated that “we [salespersons] do not want to spend time in inserting data, we want to sell. Trainings and manuals for proper systems usage would make it easier to insert data in correct form. By providing the same training for everyone, data would be inserted similarly. Then it is easier to compare”.

5.2.4 Culture

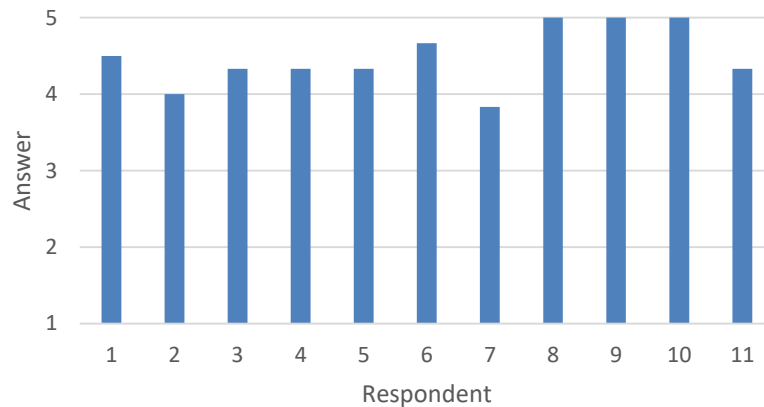


Figure 10. Target state of maturity in Culture dimension

Target state of culture was set relatively high by every respondent (see figure 10). A Vice President of one business line stated that target organization should create a culture where existing data is the existing information. Nowadays, for example, while reviewing the last month’s sales figures, a front line salesperson could argue that he/she has a possibly deal upcoming, but the person is not just documented it to CRM system. The same Vice President added that this way of culture should end: every possible deal – and a piece of data related to sales – should be documented to CRM. This would enable better sales analytics.

Another Vice President on a business line stressed that the importance of using systems properly should be shown to every employee. As an example he mentioned, that front line persons should know that the estimates are based on the data inserted to the systems, and if the data is not inserted properly, estimates are not correct. Third Vice President of a business line also see that “we should show the benefits why it is important to keep data updated. Proving what is possible if we have even better data quality. Some incentives could be used [to improve data quality] if necessary”.

Interviews brought up opposite opinions as well. Regional Sales Manager mentioned that “incentives are not maybe the best way to enhance CRM usage. It should be [part of] your everyday job”. Another Vice President of a business line would like the organization to reach ‘level 6’, where systems are used properly because of the joy of using those.

Despite some contrary opinions, many respondents would see incentives as a good idea for improving maturity in culture. Senior Sales Manager stated “there should be incentives for using systems properly. Culture starts to change when people know someone is

monitoring the usage and their bonuses are dependent on their proper usage of the systems”. One of the Vice Presidents is on the same line: “incentives would support the proper usage”. Same was said by the business line Controller. “Incentives would guide to a more proper usage of the systems. If data is somewhat accurate, then estimates are also somewhat accurate.”

Incentives, however, was not the only thing that raised discussion. One of the Vice Presidents mentioned that “we should create an environment where people are proud of their data quality, possibly even compete which team has the best data quality. We should also set up a campaign that highlights the importance of our CRM and data inside it. These would have a positive effect on culture”.

Another Vice President spoke about providing time to keep CRM updated. “We should definitely allocate assets to proper usage of the systems. If proper usage increases, it has a positive effect on processes and therefore to data quality.” Data transparency was also mentioned: “it should be clear to front lines, and others inserting data, how that data is really utilized. This, at the same, reduces siloes” Front lines should also benefit from inserting data to the system: “they will not get happy if just sales management gets more information”, stated one Vice President of a business line. Sales director, in turn, had his opinion of keeping data updated: “salespersons keep up the data relatively well. Maybe the thing is that data could be stored more consistent overall. This could happen by providing training to everyone inserting data to CRM”.

Regional Sales Manager sees that culture would improve if common training for using the system properly is provided to all and in local language. “Language barrier is a problem while inserting data to the systems. Data sharing is difficult if there is no common language. Training provides a common culture for CRM usage, which then results in better data quality and therefore in better data usage and finally in better data utilization.”

6. CONCLUSIONS

The last chapter concludes the answers to research questions, provides an action plan for improving the utilization of sales analytics in target organization, estimates the success of the research and set up topics for further research.

6.1 Discussion

Current and target stages of sales analytics utilization in target organization were conducted by using interviews. The structure of the interviews were semi-structured theme interviews, in which the focus was on gathering qualitative information about the target organization. At the same, some quantitative data were collected. Based on the both, stressing a bit more on qualitative information, current and target stages were formed. Next, conclusions of the current and target stages are presented.

6.1.1 Current state

According to the interviews, technology can be argued to be on level 3. Respondents had a quite mutual understanding of maturity, since there were not much variation on the answers. Many respondents stated that technology is not a bottleneck for utilizing sales analytics better. Also, the existing systems, including ERP and CRM, were said to be suitable for sales analytics.

In the target organization, ERP and CRM systems exist and are also partly integrated. Data is mostly available without siloes between the systems, and data is mostly reachable for people needing it. The largest and most important accounts are linked and integrated, but the overall integration is missing.

Data gathering were seen to be mostly part of sales process, but there are still some data that is inserted manually outside of sales process. Sales process generates data, but some respondents' expressed their concern about the data consistency. Therefore, it is very important to have data gathering at high maturity. Data gathering is mostly consistent in the regional levels, but not on the organizational level. Some regions have their own way to insert data to the systems and it sets challenges for data comparison.

Speaking of comparison, data usage is dependent on the comparable data. Data usage were seen to be difficult as there is not fully comparable data available from every region and country. Therefore data usage is mostly manual and ad-hoc based. Reports are generated manually combining the data from CRM, ERP and separated Excels found from employee's hard drives. Automatically reports exist, but those have to be manually adjusted before gaining valuable information.

Governance's maturity were argued to be on level 2 by the respondents. They all have somewhat similar thoughts about the current state, in which the biggest concern is data quality and its ownership. Data ownership were seen to be inconsistent as there are situations where it is not clear who is responsible for updating the data.

Processes for data handling in target organization are somewhat existing, but mostly for easy data. Sales process is under update while this thesis work is conducted and therefore it is going to be up-to-date soon. However, the process does not unequivocally state the data gathering phases. For example, the process does not include the information about in which phase a new opportunity should be marked as 'closed' to CRM.

Naming the ownership for the data is mostly missing in the target organization. Data is usually inserted to the systems, but it is not clear who should monitor whether the data is inserted correctly or not. Many of the respondents also mentioned that there are no clear owner for data and therefore it is challenging to trust data. The problem, according to the respondents, seems to be the data ownership.

When it comes to managing the integration of ERP and CRM, there are existing plans for improving it. Respondents stated that linking old accounts is not so important, but the new accounts should be all linked between the systems. The biggest accounts are linked manually afterwards, and for main customers the data linking is at relatively high level. Although, the target organization reaches the level 2 in governance with the help of well-organized main customer's data and ongoing sales process update.

According to the interviews, people-dimension is seen to be on level 2 overall. Respondents stated that employees usually have a general understanding about data literacy, but for today's business general understanding is not enough while making forward-looking decisions. Data visualization skills are, based on the interviews, very skewed since the excellent usage of BI-systems is limited to only small amount of persons. The rest of people are having a hard time with BI-systems. These persons tend to rely on their Excel charts, or even their subordinate's generated charts in case person's own skills are very limited.

Data literacy in the target organization can be seen to be somewhat average. Reports can be mostly read in the way that gotten information can be used in decision-making. Skills to do reports in target organization is moderate and data can be somehow visualized using spreadsheets, on average. However, the skills variates a lot: the top BI-tool users are highly skilled, but their number is limited. In other words, they do not have time to do all the reports used in the organization. Moreover, some respondents highlighted that on the long term reports should be generated automatically, which is not the case nowadays.

Employee's skills in using systems were seen to be mostly good. In target organization, people have enough skills to use systems properly and training is provided if asked. There are some common education provided when it comes to usage of the systems. For example, CRM-tool has training videos which are visible for everyone using the system.

In the culture dimension, the average of respondents' answers set to 3. In target organization, attitudes towards data and analytics are quite good. Many respondents said they like to see data and utilize it in decision-making. However, a common concern was the quality of data, which reduces the willingness to use it. It seems that people want to use data in decision-making but the quality sets challenges as the data cannot be trusted. This occurs because of the culture for proper systems usage is only somewhat existing and there are still a lot room for an improvement. Also, the motivators for proper usage of the system were largely mentioned in the interviews.

According to the interviews, employees have partly positive attitudes towards data utilization. Decisions are mostly based on data in the situations where reliable data is available, whereas other situations are still handled mostly with guts and tacit knowledge. Data for decision-making comes mostly from ad-hoc generated reports by sales support teams. Ad-hoc reports include usually information from several sources, which are not always the same between the reports. For example, same report may include data from the source which was not noted on the previous report.

Data is shared mostly well in the target organization. Data is shared mostly effectively between the business lines and employees partly understand the benefit of sharing. Reason for this is, that people believe they have a better chance to keep their job if they have valuable tacit information.

Also, the data transparency is mostly missing in the target organization. The front line employees do not understand why it is important to have data inserted correctly and keeping it up on a regular basis. There are no existing incentives for proper usage of the systems. Although, the level 3 in culture is achieved because the attitudes to data and its utilization are good. Current state of maturity is presented in the table 7.

Table 7. *Current state of sales analytics utilization in target organization*

Level	Technology	Governance	People	Culture
1				
2				
3				
4				
5				

6.1.2 Target state

According to the interviews, technology were not seen as a bottleneck for better utilization of sales analytics. Respondents stressed the data integration and data gathering as those are very important in terms of having good data quality. Existing technologies, in turn, were seen to be suitable for making utilizing analytics possible.

Respondents see that data integration should be on a little bit better level. ERP and CRM should communicate better to avoid inserting data twice or even more. At the same, data would sync better, which enables more reliable data as the information is same throughout the systems. Some of the respondents hoped to have full integration between ERP and CRM, but nearly all of them lowered their opinion when the resources, including time and money, were taken into account.

Data gathering should, according to the interviews, be more automatized and more systematic. Sales process should generate data in more consistent and more comparable form. Some of the data can be inserted manually outside of the process, but sales data should be mostly gathered according to sales process. Respondents also mentioned that there should be someone to be responsible that sales process generates data that can be utilized for decision-making.

Data usage should be more automated throughout the organization. Respondents mentioned, for example, that data is always manually adjusted before using it in decision-making. In addition, reports should be more automatic, and not done as an ad-hoc tasks. Also, respondents stressed that reports should be up-to-date all the time.

Therefore, some automation for data should be achieved. There are, however, an existing BI-tool where most of the figures are available, but it is not largely used due to the organizational culture. It was also hoped that BI-tool would automatically visualize the latest figures from CRM. Although, target state for technology can be argued to be on level 4, which is a level higher than its maturity now.

On the contrary to technology, governance was seen as one of the bottlenecks for utilization of sales analytics since data quality and its ownership is somewhat missing and therefore causing trust issues to data. Better data quality and ownerships were largely mentioned in the interviews. Processes were also discussed and some improvement in it was seen important.

Respondents think that sales process should be in the form that it can generate high quality data. Process, in other words, should be managed better and there should be someone having the responsibility of the process being updated. Process, in addition, should be monitored more often in order to find the improvement points and then handle those.

Data ownership were seen to be a thing that should be at its place. There should be someone who constantly monitors the data being up-to-date. Ownership should be named automatically as part of sales process. Ownership should also be clearly noted, that everyone knows who is responsible for the certain part of data. For example, CRM accounts shows who owns the account, but that is not always the person being responsible for updating the information. This sets an issue for data quality.

Speaking of data quality, almost all respondents stated that data quality should be on the level in which it enables systematic and comparable predictive analytics through shared BI-tool. In practice, this means data quality should be continuously monitored by, for example, master data governance team. Although, arguments and analysis from the interviews support governance's target state to be set to level 4 – two levels above its current level.

According to the interviews, maturity in people dimension should be on level 4. Many respondents spoke about employees' skills in using the systems, which should be a bit higher and also more consistent throughout the organization. In turn, skills in data literacy were also discussed. Data literacy should reach a higher level in the target organization, as it is getting more and more important topic when it comes to gaining competitive advantage from data. Respondents mentioned that data literacy should be on the level in which reports can be read very well and information gotten from those can be effectively used in decision-making.

Skills in creating reports varies a lot between the employees. Respondents highlighted that skills should be more consistent and every person creating a reports and visualizations should have – at least – a good skills in it. However, respondents also mentioned that not everyone has to be good at creating reports, since not all of the employees are doing those.

In addition, most of the employees stressed that reports and numbers should come straight from the systems, and then the visualizations are made by data analysts. Therefore, skills in building easily understandable visualizations in BI-tools is important in the long term and should have a high maturity.

Respondents have mostly the same opinion, that employees should have enough skills to use systems properly and training for keeping up the skills should be provided proactively. If the skills of using systems properly does not exist, data is inserted to the systems inconsistently, which have a negative effect on data quality.

Among the respondents, culture was seen as a bottleneck for the utilization of sales analytics. Many of the respondents set the current state of culture's maturity to a relatively high level, regarding to the fact that it is stated to be a bottleneck. They mentioned that culture should be more than just '*somewhat existing*', and all the regions and business lines should take the cultural issue more seriously. In addition, many respondents stated that target organization should put assets on guiding and supporting the proper usage of the systems.

Respondents see that target organization should have a very positive attitudes towards data utilization. Decisions should be mostly based on the available data and predictions should be made by using the data over guts and feelings.

According to the interviews, data, information and knowledge should be shared very effectively throughout the organization. Employees should understand the cumulative benefit of sharing data. There should be zero people thinking concealing data is good for career. Also, there should be no siloes in the organization that prevents the effective data sharing. In addition, data sharing should be mostly through CRM system, since it would help finding the information. Data and information being in the one systems enables better data sharing and has a positive effect on data availability.

Systems, in turn, should be used properly and according to the organization's policy. Incentives for proper usage should exists and usage should be actively monitored. Also there should be a monitoring process for proper system usage.

Speaking of incentives, some respondents said that those should be based on CRM data, which would then increase the usage of the systems. Also, it would guide to a proper usage: if the CRM data is not updated and correctly inserted, it has a negative effect on

employee's bonuses. On the contrary, CRM being updated provides a positive incentives for an employee.

A proper usage should also be monitored better. There would, for example, be a bi-weekly check-up for inserted data. This could be done by master data governance team, or similar centralized unit. By monitoring the usage, it is possible to identify the challenges which decreases the quality of inserted data. It would, at the same, guide and support employees to insert data to the systems in correct form, as they would get informed if their data is not up-to-date. All in all, target state of culture is arguably set to level 5 because company really wants to improve its maturity in this matter and is willing to put resources in it. Target state of maturity is presented in the table 8.

Table 8. *Target state of sales analytics utilization in target organization*

Level	Technology	Governance	People	Culture
1				
2				
3				
4				
5				

6.2 Research questions

Main research question for the research was *How to improve the utilization of sales analytics in industrial organization's automation and project division by using maturity model?* Being able to answer to the question, few secondary research questions were drawn. Answer is got as a conclusion of the secondary questions.

Secondary question 1: What is business intelligence and analytics for sales?

Business intelligence “is used to understand the capabilities available in the firm; the state of the art, trends, and future directions in the markets, the technologies, and the regulatory environment in which the firm competes; and the actions of competitors and the implications of these actions” (Negash 2004). This also applies to sales in which, for example, future trends of markets are extremely important to understand. Analytics in sales can be seen as the “extensive use of data, statistical and quantitative analysis, explanatory and

predictive models, and fact-based management to drive decisions and actions” (Davenport & Harris 2007).

Secondary question 2: What are the dimensions that have an effect on sales analytics and what are the most critical ones?

In the workshop held with target organization, it was discovered that there are several factors that have an effect on how well sales analytics is utilized. However, it was found out that four factors stood out from the rest: technology, governance, people and culture. The others having a minor impact on sales analytics utilization were infrastructure, organization and data management. However, it should be remembered that sales analytics is a supporting task for companies and it is affected by company’s result. There are many other supporting tasks as well competing of the same resources as sales analytics. This, in turn, can be seen as a dimension that is also effecting on sales analytics.

To put it bluntly, the higher maturity in certain dimension, the better utilization of sales analytics. However, the maturity is interdependent on every dimension and therefore all the dimension should be taken into account while aiming towards a better sales analytics utilization level.

Secondary question 3: How maturity model can be used to determine the current state of a company?

In general, maturity models provide companies a framework to understand where they are and where they want to be in the future on the particular topic (Halper & Stodder 2014). Maturity models tend to have three common set of components: dimensions, level of maturity and attributes (Moore 2014). The researched topic is divided to dimensions, which are factors that have an effect on the topic. For example while heading to better utilization of sales analytics, dimensions having effect on sales analytics are technology, governance, people and culture.

Next the maturity of each dimension is figured out by conducting analyses of the company. These may be interviews or forms that employees fill in. Next, the results are analyzed and the researcher makes conclusions and draw a presentation of a current maturity of the selected topic.

Maturity models have proved to be an important factor as they enable a better positioning of the organization and help find better solutions for change (Becker et al. 2009). However, the model has to be created with care as one of the most common pitfall in maturity models is the lack of shared understanding of every dimension and attribute (Moore 2014).

Secondary questions 4 and 5: What is the current state of the organization in utilizing sales analytics? What is the desired level, a goal, in utilizing sales analytics?

Table 9 presents the findings of the research. Current state is shown in green and target in orange. According to the interviews with company representatives, technology was plotted to level 3 and its target to level 4. It was discovered that the technology is on a relative good level already and it does not seem to be a bottleneck in improving the sales analytics utilization. Governance, in turn, appeared to be a bottleneck as the ownership and the quality of data is lacking. Therefore governance's current state is 2 while target being 4.

With the people dimension, the situation is quite same than in governance. Current state is 2 and target state was plotted to 4. There are still persons that are not utilizing analytics at all and have negative attitudes towards data utilization, which lowers the current state to 2. Speaking of culture, it was seen to be on level 3 and target state was set to very high. This indicates that target organization wants to put an effort on having an analytic-positive mindset and a culture where data is systematically and efficiently used in decision-making.

Table 9. *Current and target state of sales analytics utilization in target organization. Current shown in green and target in orange*

Level	Technology	Governance	People	Culture
1				
2				
3				
4				
5				

Secondary question 6: How to get to the desired level in utilizing sales analytics?

The target organization is mostly two steps behind in desired maturity level. Exception is technology, in which target state is one step above than the current. Advancing to level 4 cannot be done without first reaching the level 3, and for the culture dimension the same applies but for the levels 4 and 5. As it can be seen, target organization's objectives are quite ambitions. It requires a lot of work and resources to advance two levels in maturity,

especially when talking about moving from already satisfying level of maturity to a very high level.

Realizing the fact that resources are limited, it is not possible to advance in every dimensions at the same time. There are, also, some dependencies between the dimensions, which are determining the order of advancing in the maturity. Therefore, a roadmap is built, which guides the organization from current to target state. The built roadmap takes all the dependencies into account and it is highly recommended to follow the steps on the right order. Roadmap, with every step and its impact, is presented in part 6.3.

6.3 Implementation schedule for roadmap

As stated earlier, target organizations' target state is mostly set to two steps higher in maturity than current levels. However, it is not possible to achieve the target state immediately: improving maturity is a step by step process where every level has to be achieved before advancing to the next one. In this subpart, a 12 month roadmap is presented to guide the organization towards its target state.

Roadmap has 6 phases and those are dependent on each other. In other words, it is not meaningful to execute just a phase 4 and leave other phases off. After every phase, a visual presentation of the maturity at that point is given.

Phase 1:

Roadmap starts from improving the maturity in Governance. Many respondents saw it as a bottleneck for utilizing sales analytics. Especially the problem was data ownership and data quality. Quality is partly linked to data ownership since there are situations in which people doesn't know who owns the particular data and, therefore, who is responsible for updating it. Tackling the problem, first action is to nominate a person responsible for the target organizations' data. This would enable better understanding of data and its quality. At the same, target organization gets a person that really owns the data: in other words, a person who is really is responsible that data is accurate and updated. This person would also take care of processes related to data and makes sure that data handling processes create high quality data.

Also, a research of what kind of information is useful for front lines and management should be conducted. This would increase understanding of useful data, which is critical when planning to set targets for data quality. By using the results of the research, definitions of what good data quality means should be designed. After having defined the frames of good data quality, an update for the common policy of using the CRM system should be updated. This would improve data quality and its availability as the data is inserted according to the common policy of the organization. It also has an effect on data comparability.

Speaking of data comparability, next step is to create a process to ensure that the common policy of the CRM system usage is followed throughout the organization. This could be, for example, created by a just nominated person that is responsible of data. Relating to CRM usage, next action would be to ensure that skills to use CRM system is part of recruiting process.

Lastly in phase 1, organization should set up a team to continue ERP & CRM integration. Now the systems are only partly integrated, which is not enough in terms of sales analytics. Team's responsibility is to ensure that ERP & CRM linkage is made to all new accounts and to most important old accounts. Better integration would mitigate quality issues, increases data quality and decreases double-inserts for data.

Phase 1 is mostly about improving maturity in Governance dimension, but it has also an effect on Culture since the common policy is updated and new audits for its usage are established.

Table 10. *Target organization's maturity after first phase is presented as a numeric value (green indicates current stage and orange target state)*

Level	Technology	Governance	People	Culture
1				
2			3	
3	3	3		3+
4				
5				

Phase 2:

First step in phase 2 is to set up a map or a process chart in which it is clearly visible how data inside target organization is used. Map or process chart would highlight the importance of inserting data properly: employees can concretely see what happens if data is not updated and correctly inserted. It also increases the understanding about how data is used and this may motivate front lines to pay attention to data insertion. Data transparency is also improved as front lines can then see how data is used in decision-making. This way front lines could understand that if they are not inserting data properly, estimates and predictions are not accurate and therefore wrong decisions may be drawn.

In line with the map or process chart, target organization should establish a campaign which points out the reason why it has a CRM system. Now some of the target organizations employees feel that the CRM system as necessary thing that takes out your time from the actual work. At its best, CRM system offers a place where every important information of customer's relationship can be saved for further use and to serve customer better.

Next, target organization should put resources to enhance a culture where everyone knows who is responsible of the particular piece of data. Now it is not clear for everyone who is responsible for the account in CRM. CRM shows the responsible person, but the named person may not be a person who is updating and inserting information to the account. Account owner should always be a person who really is responsible for keeping the data updated.

Target organization should also look for possibilities to improve its CRM systems' search-tool. The search-tool is a bit outdated and with a little improvements in it, target organization could achieve better data availability. Now people are struggling with the search tool, which causes challenges in searching useful information and therefore using the information in decision-making.

Relating to CRM and ERP systems, target organization should research the possibilities to establish the newest features of its CRM and ERP systems. This, however, should be executed only if the research of useful information needs requires newest features of the systems.

Phase 2 would improve the maturity in Technology and Culture. Technology takes a steps ahead as the search tool will be improved and the research of newest features will be conducted. Culture's maturity reaches almost level 4, since the importance of proper inserts of data is highlighted and the meaning of CRM systems is pointed out more clearly.

Table 11. Target organization's maturity after second phase is presented as a numeric value (green indicates current stage and orange target state)

Level	Technology	Governance	People	Culture
1				
2			2	
3	3½	3		
4				4-
5				

Phase 3:

Phase three concentrates on improving maturity in Technology and People dimensions. Target organization should first update on-time instructions for CRM system usage. CRM system could be set to guide users what the fields requires and in which form the data must be inserted. This improves data quality since data may be inserted more properly. System could also set a prompt to user if data is not inserted according to the organizations' policy.

Next, organization should improve online training inside CRM system and possibly in a local language. There are already training videos inside CRM, but those are outdated. By improving and updating the instruction videos, employees have a better possibility to train and check how to use the system correctly. Videos could also be used as a part of training program in the future.

After having updated the online training videos, target organization should start conducting a researches if the existing CRM system is suitable for building a budget in it and if it can be used for centralized sales communication. Nowadays not all the discussion about sales and customers end up to a CRM system, which makes getting a big picture of the customer and markets very hard. Also, it should be checked whether the budget could be built in CRM system or not. This would enable many possibilities to motivate users to use systems properly, for example, if lead is not in the system it will not get a budget.

In order to really focus on employees skills in using the CRM system properly, target organization should set up a CRM usage training program which everyone using the system need to complete. This could be carried out as a certificate program: after having

completed the training, user gets a certificate of it. Without the certificate person does not have a right to use the system. Certification program would ensure that everyone has skills to use systems according to the policy.

Table 12. Target organization's maturity after third phase is presented as a numeric value (green indicates current stage and orange target state)

Level	Technology	Governance	People	Culture
1				
2				
3		3½	3	
4	4			4
5				

Phase 4:

Phase 4 pays attention to maturity in People and Culture dimensions. Employees should have enough skills and resources to use systems accordingly and at the same, the culture should be changed to the direction where data and the systems are seen important.

Target organization should provide resources for keeping CRM data updated. This could be implemented for example by setting a percentual amount of weekly worktime for updating CRM system's data. This way employees cannot say that they did not have enough time to update and insert data correctly. It also guides away from the culture where people are just quickly inserting some data to the system.

Next, a proper incentives that supports data being correct and updated should be designed. Data quality should be high, otherwise your personal target are not met. While checking whether the data quality is high or not, organization can use the data quality definitions that were designed in the phase 1. Data quality could for example be part of employees' commission of payments. By continuing the high quality data check-up, a tool that reveals the mistakes and poor qualities in data should be created. It could also be a key performance index (KPI) measurement tool.

Target organization should also introduce an incentive program where data quality is part of personal development plan targets. Data quality could be brought to employees' development discussions as well. However, data quality cannot only be part of the front

line's target, but also part of sales managements' targets. For sales management, the incentives should be relatively strong, since they cannot accept data being wrong for their subordinates. This way – partly forcing the culture to a better form – target organization could get more out of its CRM system and its data and thus have a possibility for a better sales analytics and more data-driven business-decisions.

Table 13. Target organization's maturity after fourth phase is presented as a numeric value (green indicates current stage and orange target state)

Level	Technology	Governance	People	Culture
1				
2				
3		3½	3½	
4	4			
5				5-

Phase 5:

On the fifth phase, the stress is in Governance and Culture. Governance's maturity is improving since the market information is more precisely inserted to the CRM system and culture is taking steps ahead because of better understanding where data is used in the organization.

First, target organization should create a plan for adding more market information to its CRM system. By executing this, organization can get better forecasts and predictions about the markets straight from the CRM system. Nowadays all the market information gotten from CRM system has to be manually adjusted before using it, which is not the way it should be. Market support teams could, for example, start gathering market information to CRM system, which saves front line workers' time for other tasks.

After having made it clear in earlier phases how data is used in the organization, company could start establishing a sales analytics tool, which helps front lines to serve customers better. Now that useful information is defined and sales management can get a lot high quality data, it is time for front lines to get an advantage of improved data quality as well. Sales analytics tool shows front lines information that they have inserted to the system and they can also see some predictions and estimates about the future. This way front

lines – that are main users when it comes to inserting data to CRM system – can concretely see that if they have used inaccurate data to CRM system, the predictions are not correct. This, in addition, increases understanding why it is very important to insert data properly.

In the fifth phase, organization could also start offering formal training to business intelligence tools for every employee needing it. Now there are some active BI-tool users that are highly skilled in it and then there is the opposite. These people needing guidance in using BI-tools should be taught in order to get more insights out of data. Even using some basic features of BI-tools (i.e. filtering, sorting) is difficult – partly because training is not provided actively – and this prevents organization to fully utilize the power of its data. People should know how to use data, not just how to insert data to the systems.

Table 14. Target organization's maturity after fifth phase is presented as a numeric value (green indicates current stage and orange target state)

Level	Technology	Governance	People	Culture
1				
2				
3			3½	
4	4	4-		
5				5

Phase 6:

Last phase is about Governance and People. First, target organization should set up again its annual award that has been paused few years: a CRM user of the year. Award would encourage people to take CRM system seriously and at the same push towards a proper usage. Also, a new award should be introduced: the best data quality for teams. In this category team's whole data sample is compared to other teams' data and then evaluate which team has the best data quality during that year. Data quality competition shows that organization is taking its data quality seriously, and it also enhances team work and commitment.

Next, target organization should start offering continuous formal training for proper usage of its CRM system. CRM certificate program – presented in phase 3 – could be expanded to be completed once a year to ensure that everyone using the system knows how to use

it according to the policy. Continuous training would also increase data comparability, since everyone is guided to use the system similarly.

After having completed all the previous phases, target organization can start establishing a process where budget for a lead is gotten only if it is opened in CRM system. This would enable more systematic sales management. For aiming towards a better sales analytics – and also towards a systematic sales management – sales management has to know the amount of ongoing sales processes.

While offering a budget for a lead only if it is inserted in CRM, it guides salespersons to insert data every time to the system. This, in addition, decreases data siloes and data concealing, which is very valuable for business. At the same, as data is inserted to the system every time and every user knows how to insert data properly, target organization will get more data with higher quality, which are both related to better understanding of the business. Increased amount and quality of data enables better utilization level of sales analytics, which leads to better forecasts and estimates and therefore a better decision-making.

Table 15. Target organization's maturity after sixth phase is presented as a numeric value (green indicates current stage and orange target state)

Level	Technology	Governance	People	Culture
1				
2				
3				
4	4	4	4	
5				5

6.4 Evaluation of research

The objective was to help organization to find out the current state of sales analytics and its target state. Even though expectations were not very promising as the target organization is a large global company and development steps tend to be slow, the objective ended up succeeding well. It was relatively hard to figure out the current and target stages of the company since the organizational structure is huge and ways of working differ between business lines and a regional levels.

For the first secondary question, *“What is business intelligence and analytics for sales?”*, the answer is quite general. However, the topic itself is relatively general and therefore it can be argued that the answer is in line with the question it is answering. This secondary question is answered in theory section and partly touched in the empirical part. The second secondary question, *“what are the dimensions that have an effect on sales analytics and what are the most critical ones?”*, the answer is mostly presented in subparts 3.3 and 4.3. The results are found from literature and then applied to the customized maturity model, which confirms the theory being in line with reality.

Third secondary question, *“How maturity model can be used to determine the current state of a company?”*, is answered quite well in the part 3. However, further investigation of wider set of maturity models applied to analytics could have provided more detailed information about how the maturity models are used in real world. Fourth and fifth secondary questions, *“What is the current state of the organization in utilizing sales analytics and what is the desired level, a goal, in utilizing sales analytics?”*, were answered through a conducted research. Results are unique because of the customized research and therefore there are no comparable data available. But it can be argued, that the research answers well to the research questions, since the current and target stages were able to be drawn.

Answer for the sixth secondary question, *“How to get to the desired level in utilizing sales analytics?”*, is presented in a roadmap form. Roadmap is formed by using the information gotten from the interviews and researchers own contribution. Roadmap could have been more detailed, but then it would have raised other challenges related for example time scheduling and auditing.

Speaking of a customized maturity model, it was built in co-operation with target organization’s representatives. Co-operation made it possible to gain insights of the company, which would otherwise have been left off. Maturity model overall was a success and according to the target organization’s representatives it illustrates the company’s state very well and shows which factors are critical for improving the utilization of sales analytics. Maturity model, in turn, can always be specified better and this research does not make an exception. For further improvement, the definitions of every dimension and every level of the dimension could have been expressed more clearly. That would have ensured a shared understanding of every dimension and their levels between the respondents.

Interviews for defining the current and target stages were a bit challenging since there were none examples for the questions. Therefore the questions had to be built from the beginning. After the questions being formed, a test interview was made to verify that the interviews provide answers to the research. Conducting a test interview was a good step, which can be recommended for everyone carrying out a qualitative interviews for thesis work. However, there would have been a room for second or third test interview as those would have helped in gaining more structured answers. Now the answers were quite unstructured which set up a challenge for analyzing the results.

Interviews were conducted just before summer holidays, which enabled a sufficient sample of answers to be analyzed. The quality of answers, in turn, varied quite a lot. Some interviews were very challenging due to several things, language barrier and knowledge of what analytics mean to mention. Most of the interviews were very useful and provided a lot information about the current and target stages as well as possible steps that should be taken to achieve a higher maturity.

For the further improvement, the questions could have been formed to guide the respondents to think the big picture than just a narrow area of interest. Although, the interviews can be said to be successful since it was possible, according to the answers, to draw the current and target stages of maturity.

Overall, the research was a success. Results are concrete and useful for the target organization, which was one of the main objectives for the company. Implementation schedule for the roadmap is not yet decided, but it is planned to be started in the near future.

6.5 Future research topics

Some interesting future researches could be conducted for continuing the topic onwards. The same research can be conducted inside the target organization in a larger scale. Now the scope was automation and project division, but it could be done for other divisions as well. It is, however, important to remember that the maturity model was customized to automation and project division's needs, and therefore the customization should be done again according to the respective division.

A reasonable future research could also be how the improvement from current to target state have effected to the organization's operations. In other words, what is possible then compared to the state before.

Also some kind of audit for the roadmap would be an interesting research topic for the future. Audit could, for example, include a follow-up for the roadmap and a research about what are the most critical phases for improving the utilization of sales analytics.

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